P/40 USER'S MANUAL

TABLE OF CONTENTS

PREFACE

This manual details installation, operation and user maintenance of the Plexus P/40 computer system. For additional information, see the appropriate listing in Appendix H -- Bibliography of Related Publications.

The manual consists of eight sections:

      (1)   Description

      (2)   Installation

      (3)   Operation

      (4)   Preventive Maintenance

      (5)   Component and Module Replacement

      (6)   Appendixes

      (7)   Figures

      (8)   Notes

To order additional copies of this manual, contact your Plexus Sales Representative.

Comments

Please address all comments concerning this manual to:

    Plexus Computers Inc
    Technical Publications Dept
    2230 Martin Ave
    Santa Clara, CA 95050
    408/988-1755

FCC COMPLIANCE NOTICE

W A R N I N G

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. As temporarily permitted by regulation, it has not been tested for compliance with the limits for Class A computing devices pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

INTRODUCTION

The Plexus P/40, an advanced 16-bit minicomputer system, runs under the popular UNIX* operating system and delivers a powerful combination of performance and reliability. The P/40 supports many industry-standard hardware and software interfaces, and its per-user cost matches that of small microcomputer systems.

The P/40 architecture supports a powerful job processor, a large main memory, serial I/O processors and high-performance peripherals. The P/40 reliably detects and corrects memory and disk errors. It also makes extensive use of LSI circuitry and features peripherals with high reliability.

The P/40 accepts a wide variety of peripheral devices through its industry-standard disk, tape, terminal and printer interfaces, and its industry-standard I/O bus. Moreover, the P/40 accepts numerous existing application software packages written in standard programming languages.

This manual supplies guidance for installing, operating and maintaining the Plexus P/40. Several appendixes and an annotated bibliography give supplementary assistance. Figures are all contained in a separate section at the back of this manual.

STYLE NOTES:

References -- A reference of the form "see MKFS(1)", for example, is a reference to the "MKFS" entry in section "(1)" of the Plexus publication: UNIX Programmer's Manual -- vol 1.

Implied Carriage Returns -- User response to prompts is indicated in **bold type**. It is assumed understood that the user response line must be ended by a <return> key. These <return> keys are generally not indicated unless the entire user reponse consists of a <return>. At times, a response need not end with a <return>, for example after a <ctrl>d has been typed.

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*UNIX is a trademark of Bell Laboratories. Plexus Computers Inc is licensed to distribute UNIX under the authority of AT&T.

CHAPTER 1

DESCRIPTION

This chapter describes the physical characteristics of the Plexus P/40 computer system and provides an introduction to its primary controls.

Physical Description

P/40 specifications of outside measurements and weight are:

    Height   55 in. (140 cm)
    Width   22 in. (55 cm)
    Depth   34 in. (85 cm)

    Configured Weight   400 - 500 lb (180 - 225 kg),
                            depending on options ordered

The major features of the Plexus P/40 appear in Figures 1-3 (see FIGURES section at back of this manual).

Controls, Switches and Indicators

The controls, switches and indicators requiring most familiarity appear in Figures 4-6.

System Controls (Figure 4)

        (1)   POWER ON/OFF Switch and Indicator -- Controls power to
              the system. Lights while system power is ON.

Tape Drive Controls (Figure 5)

(1) LOAD/REWIND Switch and Indicator -- Press to load or rewind tape. Indicator blinks while loading or rewinding, lights when BOT is reached.

(2) UNLOAD Switch and Indicator -- Press to unload tape. Indicator blinks while unloading, lights when tape is finished unloading.

(3) ON-LINE Switch and Indicator -- Press to toggle tape drive on- or off-line. Indicator lights when tape drive is on-line.

(4) WRITE ENABLE (WRT EN) Indicator and TEST Switch -- Press Test switch in conjunction with other switches to select test functions. Write Enable indicator lights when a tape write can be performed.

(5) HIGH-DENSITY (HI DEN) -- Not used in this configuration, it is intended for use with 3200 bpi.

(6) POWER ON/OFF Switch -- Controls power to the tape drive only.

Processor Controls (Figure 6)

(1) POWER ON Indicator -- Lights when processor power is on, that is, when the processor power switch located on the processor rear panel (Figure 10) is in the ON (up) position.

(2) RESET Button -- Press to reset processor and boot system software.

CHAPTER 2

INSTALLATION

This chapter describes the steps necessary for proper hardware
installation of the Plexus P/40. Sections cover power
requirements; environmental requirements; shipping carton
contents; unpacking; inspecting; preparing the P/40 for use;
attaching the system console, terminals and printers; an
installation checklist and applying power to the P/40.

Power Requirements

The Plexus P/40 offers six power options (option must be
specified at time of purchase and is factory-installed only).
The six power options available are:

```
115V   60hz   (105-125V @ 7a)      (Plexus default)
220V   60hz   (207-235V @ 3.5a)
240V   60hz   (215-253V @ 3.5a)

115V   50hz   (105-125V @ 7a)
220V   50hz   (207-235V @ 3.5a)
240V   50hz   (215-253V @ 3.5a)
```

(NOTE: Amperage indicated is for operating current only for a
standard configuration; additional amperage may be required for a
second disk drive or more than two memory boards.) All systems
use a 15-amp circuit breaker with a 15-amp grounded outlet.

For 115V/60hz operation, use a standard 3-prong plug. For
220V/240V operation, install the appropriate plug according to
the following:

```
        brown           = line (hot)
        blue            = neutral (return)
        green/yellow    = ground
```

Environmental Requirements

The following environment must be provided for proper operation
of the Plexus P/40:

    Temperature .... 40 - 100F (5 - 38C)
    Humidity .... 20 - 80% noncondensing

Inspecting the Shipping Carton

Inspect the carton for visible shipping damage.   If damage is
found, contact carrier immediately. Do not unpack the contents
before notifying carrier. If no exterior damage is found, proceed
with the unpacking sequence.

Shipping Carton Contents

The packing slip with each Plexus P/40 system lists all items in
the shipping carton. While unpacking, carefully compare the list
with received items to verify that all items have been removed
from the carton and that they match the list.

Unpacking the Shipping Carton

To unpack the P/40 system from its shipping carton, first snip and discard the two banding strips around the shipping container. Then follow the sequence indicated in Figure 7:

(1) Lift off and discard carton cap.

(2) WARNING: To avoid damage or injury, follow this instruction carefully:

Using a claw hammer, slowly remove "climps". (Climps are under extreme pressure and if detached quickly, could cause damage or injury.) Discard climps.

(3) Lift off and discard carton sides, letting down ramp.

(4) Lift off and discard foam corner blocks.

(5) Lift off and discard foam waist pads and belt.

CAUTION:

Before executing next steps, note that you will need help and must exercise extreme caution when tilting or moving so heavy a unit. Keep hands and feet out from under unit.

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(6) Remove and discard two foam base pads and one wooden support board (under P/40, not shown in Figure 7):

Using help, slowly tilt unit no more than 2 to 4 in. to one side and remove the foam base pad from under unit; while easing unit back down onto the two exposed wheels, align these two wheels toward the ramp.

Again using help, repeat this procedure in the opposite direction to remove the other foam base pad and then the t-shaped wooden support board from under the P/40.

(7) Untape two ramp filler boards and insert boards in gaps at top of ramp to form a smooth descent path.

(8) Again using help, carefully ease the unit down the ramp to the floor. Discard remaining shipping materials.

Inspecting the Plexus P/40

After unpacking the unit, visually inspect the following:

    (1) Check for scratches, rust and soiling.

    (2) Check for loose or missing parts.

Any problems should be reported immediately to the carrier and to
Plexus Computers.

Preparing the P/40 for Use

Measures have been taken to protect the P/40 during shipment.
Before using the P/40 system, the following steps must be taken.

CAUTION:

To safely execute the following procedures, first verify
that:

  (1)   The system power switch (Figure 1) on the P/40
        front control panel is switched OFF (left).

  (2)   The system master circuit breaker (Figure 2) on the
        system rear panel is switched OFF (down).

  (3)   The system power cord (Figure 2) on the system rear
        panel is unplugged from any power source.

Do not alter any of these states until all installation
and setup procedures have been accomplished.

Preparing a Tape Drive for Use

Two measures have been taken to protect the tape drive during shipment: 1) two tiewraps have been installed to keep the tape drive module from sliding out due to rough handling and 2) a foam cushion has been installed around the takeup hub to protect it from being damaged by the tachometer assembly.

To ready a tape drive for operation, perform the following procedures:

To loosen the two tiewraps:

    (1)   Remove the system rear-access panel (Figure 2).

    (2)   Slip each tiewrap loop up over the top of the vertical mounting angle to which it is attached. Do NOT cut loops, as they can be used for any subsequent reshipment.

To remove the foam cushion from around the takeup hub (Figure 8):

    (1)   Use left hand to squeeze slide release latch located under left lip of tape drive front panel.

    (2)   NOTE: Use this slide release grip to execute the next step; do NOT pull on the tape drive front panel itself.

            Pull the tape drive out fully on its slides, being careful not to damage tape drive cables.

    (3)   Place cover in maintenance-access position (Figure 9).

    (4)   Open top cover by lifting front sides directly behind front panel. Remove retaining pin from cover stay, lift two black Ny-Latch fasteners, and raise cover. Place stay in slot provided.

    (5)   Gently pull spring-loaded tachometer assembly away from takeup hub, using care to keep the tachometer assembly from springing back against the takeup hub; remove and discard foam cushion and carefully ease tachometer assembly back against takeup hub.

    (6)   Lower top cover.

    (7)   Being careful not to crush tape drive cables, slide the tape drive back into the system enclosure until it triggers the slide latch. Before reattaching rear-access panel go on to the following procedures.

Preparing the Processor for Use

On the rear panel of the processor module (Figure 10), locate the power switch. To prepare the processor for use, verify that this power switch is in the ON (up) position.

Preparing a Disk Drive for Use

The disk motor, spindle and arm are always locked during shipment (and must be locked again if you should ever move your Plexus P/40 system or disk drive). To ready a disk drive for operation, perform the following procedure:

(1) Unlock the disk drive motor (see Figure 11 for location, Figure 12 for detail).

  - Loosen the two screws "A" that hold the motor cover to the rear of the disk drive (Figure 12a).

  - Slide the motor cover to the unlocked position (MOTOR LOCK OFF) (Figure 12b).

  - Secure the two screws "A" (Figure 12b).

(2) Remove the disk drive front panel (Figure 1).

(3) Remove the two screws holding the disk drive in the system enclosure.

(4) Pull the disk drive out fully on its slides, being careful not to damage disk drive cables.

(5) Unlock the disk drive spindle (Figure 13). This step must be done from underneath the disk drive.

  - Remove the two screws which hold the spindle grounding plate cover in place and remove the spindle grounding plate cover (not shown).

  - Loosen the two screws which hold the spindle grounding plate in place (Figure 13a).

  - Slide the spindle grounding plate to the unlocked position (Figure 13 b,c).

  - Rotate the spindle pulley in the indicated **direction** only to assure free movement of the spindle.

  - Secure the two screws while assuring that the spindle grounding contact is centered on the

spindle shaft.

- Replace the spindle grounding plate cover and secure the two screws holding it.

(6) Unlock the disk actuator arm (Figure 14). This step must be done from underneath the disk drive.

- Find the actuator lock knob by looking underneath the disk drive.

- Using your hand, move the actuator lock from the locked position (Figure 14a) to the unlocked position (Figure 14b).

(7) Before sliding the disk drive back into position, complete the installation procedure that follows.

Preparing the Disk Drive Power Supply for Use

As a safety measure, the main line switch on the disk drive power supply is switched OFF for shipment. To ready this power supply for use, the main line switch must be switched ON (Figure 15):

(1)   Below disk drive 0, through the rear-access of the P/40, find the disk drive power supply (Figure 3).

(2)   Locate the main line switch and switch it ON (up).

(3)   On the same panel, locate the Remote/Local switch and verify that it is in LOCAL mode (down).

(4)   Slide disk drive 0 back into position, being careful not to crush disk drive cables.

(5)   Reinstall the two screws which hold the disk drive in place.

(6)   Reattach the disk drive front panel.

Attaching System Console, Terminals, Printers

The system console and all other terminals and printers are connected to the P/40 at the rear of the processor module (Figure 10). (This area is accessed by removing the system rear-access panel.)

The rear of the processor module contains three I/O port connector panels, each panel containing eight serial connectors and one parallel connector. For example, panel 1 contains serial connectors 0-7 and parallel connector 0. It is cabled to the first ICP board in the P/40 processor module. I/O port connector panels are labeled as follows:

```
I/O Port Connector Panels
-------------------------
   1         2         3
------    ------    ------
SER 0     SER 8     SER 16    Serial Port Connectors (25-pin)
SER 1     SER 9     SER 17          "
SER 2     SER 10    SER 18          "
SER 3     SER 11    SER 19          "
SER 4     SER 12    SER 20          "
SER 5     SER 13    SER 21          "
SER 6     SER 14    SER 22          "
SER 7     SER 15    SER 23          "

PAR 0     PAR 1     PAR 2     Parallel Port Connectors (37-pin)
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Pinouts of the RS232C serial connectors and the Centronics parallel connectors are shown in Appendix A.

Attaching the System Console

The system console must be attached to the connector port labeled
DIAGNOSTIC. This port is located on the processor rear panel
(Figure 10), just below the power switch.

The only signals that must be transmitted through the cable are
pin 2 (Transmitted Data), pin 3 (Received Data) and pin 7 (Signal
Ground or Common Return).

If your system console cable also uses pin 5 (Clear to Send) and
pin 8 (Carrier Detect), make sure these two lines are terminated.
(Unterminated lines can act as antennae, initiating spurious
interrupts and seriously degrading system performance.)

Setting the System Console Default Baud Rate -- Your P/40 system
is shipped with the system console default baud rate set for 9600
baud. If your system console terminal is set for 9600 baud, you
need not modify the default baud rate setting. If your system
console baud rate is other than 9600, either reset the console
baud rate according to manufacturer's instructions or reset the
P/40 system default baud rate as described in "Appendix I --
Board-Level Configuration Options".

NOTE: The P/40 system expects no parity and one stop bit.

Attaching Terminals and Printers

Except for the system console, a terminal or printer can be
connected to any available and appropriate (serial vs parallel)
port on your P/40 system. To attach terminals or printers to the
P/40, plug the peripheral cable connector into the appropriate
I/O port connector on the rear of the processor module (Figure
10), and secure the mounting screws on the peripheral cable
connector.

NOTE: After attaching any terminal or printer and before
reattaching the system rear-access door, allow sufficient service
loop in the peripheral cables to allow the processor chassis to
be fully extended on its slides.

Installation Checklist

As a final checklist before applying power to the P/40, verify the following:

On tape drive 0-3:
Takeup hub foam pad REMOVED   (Fig 14)

On processor module:
Power switch ON   (Fig 11)

On disk drive 0-3:
Motor lock OFF   (Fig 8)
Spindle RELEASED   (Fig 9)
Actuator UNLOCKED   (Fig 10)

On disk drive power supply:
Main line switch ON   (Fig 18)
Remote/Local switch LOCAL   (Fig 18)

Applying Power to the P/40

After all other preparations have been accomplished (as detailed in the previous Installation sections), reassemble the P/40 system enclosure. Then execute the following three steps to power up the unit:

(1)   From the rear panel of the P/40, plug in the system power cord (Figure 2) to an appropriate outlet.

(2)   From the rear panel of the P/40 (Figure 2) switch the system master circuit breaker ON (up).

(3)   On the P/40 front control panel (Figure 1), switch the system power switch ON (right).

CHAPTER 3

OPERATION

The following sections explain operation of the P/40, including: turning on the system, system startup, system shutdown, turning off the system, loading and unloading a tape, and applying software updates.

CAUTION:

Always unplug the system power cord before removing a front or rear panel, moving the system or performing any maintenance or cleaning.

Turning On the System

To turn on the P/40 system, ensure that:

(1) The system power switch (Figure 1) is in the OFF (left) position. Indicator light on switch should NOT light.

(2) The system power cord (Figure 2) is then plugged into an appropriate outlet, as described in "Chapter 2 -- Installation," under Power Requirements.

To verify appropriate voltage for any P/40 system, see the manufacturer's sticker located on the back of the system adjacent to the system main circuit breaker.

(3) The system master circuit breaker (Figure 2) is in the ON (up) position.

(4) The processor power switch (Figure 10) is in the ON (up) position.

Then push the system power switch (Figure 1) to the ON (right) position. Indicator on the switch should light.

System Startup

The P/40 automatically selftests when system power is first turned on or the hardware reset button (Figure 6) is depressed.

For details of system startup, see "Appendix B -- Booting the Operating System."

System Shutdown

If it is necessary to bring down the operating system for any reason (eg, known power interruptions, system maintenance or repair, or corrupt file system), follow the procedures described in Appendix J -- Shutting Down the Operating System.

Turning Off the System

To turn off the P/40 system:

   (1)   Perform the System Shutdown procedure described in Appendix J -- Shutting Down the Operating System.

   (2)   Turn the system power switch OFF (Figure 1).

Using a Tape Drive

Before using a tape drive, attend to recommended maintenance (see "Chapter 4 -- Preventive Maintenance").

Figure 5 shows the controls and indicators on the tape drive.

CAUTION:

The top cover and front-panel door will lock during tape-loaded functions. Any attempt to open either the cover or the door before the tape is unloaded will cause mechanical damage to the loading system.

Automatic Loading

To automatically load tape:

   (1)   Push the ON/OFF power switch at the front of the tape drive to the ON position. The tape drive fuse must function and the system power ON/OFF switch must read ON for power.

          A selftest occurs whenever the tape drive is powered on. All indicators on the front panel of the tape drive will light for about 1 sec. If all indicators except UNLOAD are then off (unlit), the selftest found no defect.

   (2)   Wait for the UNLOAD indicator to light (about 2 sec after the drive is turned on).

   (3)   Wind completely onto the reel the tape to be used.

   (4)   Gently flip down the top (center) of the front-panel door to open it.

   (5)   Insert the tape, with the write-protect-ring side down, into the tape drive front.

          NOTE: Two user actions have been identified which, when followed, will improve tape drive performance during a load operation and decrease the chance of tape damage:

          -     Tapes should be prepared using a standard half-inch tape prep tool. This tool rounds the end of

the tape leader. Eliminating sharp corners decreases the possibility of the tape snagging in the load path. The tool can be purchased from most mag tape distributors or from Plexus; selling price is approximately $60.

- When inserting a tape reel into the drive, assure that the leader is fully wound onto the reel and not hanging over the reel flange. If a wrap is loose from the reel before the air flow fans start operating, the tape has a tendency to feed incorrectly and cause a damaging jam.

  Use your index finger to hold the leader to the reel while inserting the reel. Once the tape is inserted and the finger removed, the tape may fall across the flange.

  This procedure is particularly important with a 7.5-in. reel.

(6) Close the front-panel door.

(7) Press the LOAD/REWIND switch; this locks the access doors.

(8) Press the ON-LINE switch to ON (indicator lit).

This load sequence loads the tape to the beginning-of-tape (BOT) marker. The LOAD indicator lights when the BOT tab sits at the photosensor. (LOAD indicator blinking shows that the transport is executing a load or rewind sequence.)

If LOAD indicator continues blinking more than a minute, the tape has probably failed to load correctly. Power the tape drive OFF and back ON and then reload the tape. If automatic loading fails three or four times, manual loading may be required.

Manual Loading

To load tape manually, should automatic loading fail:

(1) Place the drive in the maintenance-access position (Figure 9).

- Release the first lock retainer on the right slide.

- Withdraw the drive on its slides until the second lock engages.

-      Raise the front top cover.

(2)   Release retainer by removing pin from its pivot.

(3)   Release the two Ny-Latch fasteners.

(4)   Raise the rear top cover.

(5)   Secure the rear top cover by placing retainer (on left side) into its retaining slot.

(6)   Place the tape reel on the supply side hub, making sure that the reel sits evenly on the hub.

(7)   Turn the tape drive ON/OFF switch to ON.

(8)   Thread the tape (Figure 8).

-      Carefully move the tachometer assembly away from the takeup hub.

-      Wrap several turns of tape clockwise around the takeup hub.

-      Gently replace the tachometer assembly on the takeup hub.

-      Check for correct seating of tape on guides.

-      Check for correct threading of tape through head assembly.

(9)   Close top cover.

(10) Place transport in normal operating position by reversing steps 1 through 8 above.

(11) Press the LOAD/REWIND switch.

(12) Press the ON-LINE switch to ON (indicator lit).

The tape should tighten and advance until the BOT tab sits at the photosensor. The LOAD indicator lights to show that the transport is ready.

Unloading Tape

To unload tape:

   (1)   Ensure that the tape drive is off-line by pressing the
         ON-LINE toggle switch until indicator is unlit (off).

   (2)   Press the UNLOAD switch; this switch unloads the tape
         from any point.

         During the unload sequence, the UNLOAD indicator blinks
         and the access doors remain locked. When the unload
         sequence is complete, the UNLOAD indicator remains lit
         and the access doors unlock.

   (3)   Open the tape access door only when the   UNLOAD
         indicator stops blinking and remains lit.

   (4)   Carefully remove the tape reel.

   (5)   Close the access door.

Applying Software Updates

Refer to the installation information which accompanies each
software product.

CHAPTER 4

PREVENTIVE MAINTENANCE

he Plexus P/40 is designed to simplify preventive maintenance, allowing the user to perform many such tasks without calling on a service representative. These preventive maintenance procedures are simple yet important aspects of maintaining system reliability.

This chapter describes recommended preventive maintenance procedures for: the disk drive module, the tape drive module, the processor module and the system enclosure.

The preventive maintenance tasks to be performed are listed below according to recommended frequency. Each procedure is described in detail in this chapter.

Maintenance Tasks

Daily -- Clean tape drive heads, guides, roller guides, tape path, tachometer, tape cleaner, reel hub pads.

Monthly -- Clean or replace processor fan filters.

1000 hr -- Clean or replace tape drive filter.

As needed -- Dust or wash rack exterior and all front panels.

Disk Drive Module

Requires no preventive maintenance.

Tape Drive Module

Cleaning Tape Drive Components

NOTE: These are daily procedures.

CAUTION:

Use only a lint-free nonabrasive wipe or cotton swab moistened with 1,1,1 Trichlorethane (Inhibisol) to clean tape drive components. Rough or abrasive materials can scratch metal parts; other solvents, such as alcohol, can cause problems such as increased ISV (instantaneous speed variation). Do not soak guides with cleaner, as excessive solvent may break down bearing lubricant.

Solvent must not be allowed to come into contact with the tachometer disk located in the tachometer housing, as permanent damage may result.

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(1)   Place the tape drive in maintenance-access position (Figure 9).

(2)   Gently wipe the tachometer roller.

(3)   Clean the head and associated tape path (Figure 8).

(4)   Being careful not to damage sharp edges of blades, wipe away any accumulated debris clinging to the tape scraper blades or housing and to the three reel hub pads.

Cleaning or Replacing a Tape Drive Filter

Every 1000 hr, remove, clean and reinstall the tape drive filter:

(1) Place tape drive in service-access position (Figure 16), with PWBA down.

(2) Locate filter at front of tape drive power supply (Figure 17).

(3) Remove filter by pulling tab away from center of drive.

(4) Using compressed air, blow loose dirt off filter. If compressed air is not available, discard old filter and use new one.

(5) Reinsert filter firmly into slot, with tab facing front panel.

(6) Return tape drive to normal operating position.

Processor Module

Cleaning or Replacing Processor Fan Filters

NOTE: This is a monthly procedure.

Check the processor fan filters for dust and dirt as follows:

(1) Remove the processor front panel (Figure 1) (pops off).

(2) Remove the two filters by removing four wing nuts on each fan guard and then removing the two fan guards.

(3) Dry-vacuum or rinse-and-dry both filters.

(4) Inspect each filter after cleaning. Depending upon its condition, either reinstall the filter or replace it with a new one.

(5) Reinstall the two fan guards.

(6) Reattach the processor front panel.

System Maintenance

Cleaning the Exterior and Front Panels

Whenever dust or dirt appears on the unit front panels, clean using Miller Stephenson Chemical Co MS-260, Windex or an equivalent, commercial-grade, plastic cleaner. Put some cleaner on a soft cloth and then gently wipe the tape unit dust door and all control panels.

CHAPTER 5

COMPONENT AND MODULE REPLACEMENT

This chapter describes replacement procedures for disk drives (module, power supply or fuses), tape drives (module or fuse) and processor (module, fuse, power supplies, battery or printed circuit assemblies). It also describes shipping procedures for returning modules to Plexus for repair.

In the event of equipment problems that you cannot diagnose and correct, contact your service representative. After he has diagnosed the problem, he may have to remove a component and return it to Plexus for repair. So that you can continue using your system, he will replace the suspect part with a spare from your spares supply.

Fuse kits for the complete system are available from Plexus.

CAUTION:

Do not attempt to remove any soldered or socketed components yourself. This should be done only by a Plexus-trained service representative.

Disk Drive Module

Replacing a Disk Drive

CAUTION:

Removal of the disk drive is at least a two-person task, since the drive weighs approximately 100 lb. Do not attempt this procedure alone.

To replace a disk drive:

(1) Perform System Shutdown procedure (see "Chapter 3 -- Operation").

(2) Turn system power switch OFF and unplug system power cord.

(3) Remove the disk power supply front panel.

(4) Remove the disk drive front panel.

(5) Remove the system rear-access panel.

(6) Pull the disk drive out fully on its slides.

(7) Disconnect a series of cables as follows:

- From the rear of the disk drive power supply, disconnect AC power cable, DC power cable and power control cable (Figure 15).

- From the back of the disk drive (Figure 11), disconnect the two interface cables (processor cables A and B) and either the terminator (last drive only) or the additional processor cable A daisy-chained to the next drive.

(8) On the old disk drive, lock the spindle, actuator and motor according to the procedures in "Chapter 2 -- Installation."

(9) Remove the four screws on the mounting tabs.

(10) Slide the drive out on the rack slides.

(11) Push the slide releases on both sides.

(12) Lift out the disk drive.

(13) Unpack the new disk drive from its shipping container, retaining the container for the return shipment.

(14) From the old drive, remove all slides and install on new drive.

(15) Pack the old drive in the shipping container from the new drive, including a complete Failure Report (Appendix G), and return to Plexus.

(16) To install the new drive, reverse the above steps, reattach all cabling and terminators which had been detached from old drive.

(17) To ready the new drive for operation, perform the unlocking procedures described in "Chapter 2 -- Installation."

Replacing the Disk Drive Power Supply

To replace the disk drive power supply:

(1)   Perform System Shutdown procedure (see "Chapter 3 -- Operation").

(2)   Turn system power switch OFF and unplug system power cord.

(3)   Remove the disk drive front panel (pops off).

(4)   Remove the system rear-access panel.

(5)   Remove the three power cables connected to the power supply (Figure 15).

(6)   Unplug the line cord on the power supply from the power distribution unit.

      NOTE: The power supply sits in a tray connected by two screws in the front and two in the back.

(7)   Unscrew the four screws that connect the power supply to the tray.

(8)   Lift the power supply up and out, as the lip on the tray prevents removal from the rear.

(9)   Unpack the new disk power supply; place the old disk drive power supply in the shipping container for return to Plexus. Be sure to include a Failure Report (Appendix G).

(10) To install the new disk drive power supply, reverse the steps above.

Replacing Disk Drive Power Supply Fuses

The disk drive power supply contains two 15-amp fuses. Fuse 1 is for +5V, while fuse 2 is for +24V/-32V.

(NOTE: For 220V/240V operation, a third fuse is required -- a 1.3-amp fuse for AC -B, which is the B channel of the AC output.)

To replace disk drive power supply fuses (Figure 15):

(1) Perform System Shutdown procedure (see "Chapter 3 -- Operation").

(2) Turn system power switch OFF and unplug system power cord.

(3) Pull the disk drive out on its slides fully, being careful not to damage disk drive cables.

(4) Below the drive, find the disk drive power supply unit.

(5) Locate the fuses on the rear of the power supply.

(6) Check the fuses; if a fuse is blown, a white dot will be displayed on the face of the fuse.

(7) To replace a blown fuse, pull the fuse straight out of its 3-prong socket.

(8) Insert a new fuse into the socket.

(9) Reverse steps 1-3 above.

Tape Drive Module

Replacing a Tape Drive

CAUTION:

Removal of a tape drive is a two-person task, since the
unit weighs 60-80 lb. Do not attempt this procedure
alone.

To replace a tape drive module:

(1) Perform System Shutdown procedure (see "Chapter 3 --
     Operation.").

(2) Turn system power switch OFF and unplug system power
     cord.

(3) Remove the system rear-access panel.

(4) Disconnect all interface cables from the back of the
     tape drive (Figure 18). (NOTE: Last drive has two
     interface cables, all others have four.)

(5) Disconnect the tape drive power cable from the power
     distribution unit at the rear bottom of the system
     enclosure.

(6) Squeeze the slide release latch located under the left
     lip of the tape drive front panel.

(7) Pull the tape drive out fully on its slides.

(8) Push in the two secondary slide release latches and
     lift out the tape drive.

(9) Remove slides from old tape drive to mount on new
     drive.

(10) Unpack the new tape drive and place the old drive in
     that shipping container for return to Plexus with a
     Failure Report (Appendix G).

(11) To install the new tape drive, reverse the above steps.

(12) From new tape drive, remove takeup hub foam cushion --
     as described in Chapter 2 (Installation) -- and install
     the cushion in the old drive to ready it for shipment.

Replacing a Tape Drive Fuse

(1) Perform System Shutdown procedure (see "Chapter 3 -- Operation").

(2) Turn system power switch OFF and unplug system power cord.

(3) Place the tape drive in the service-access position (Figure 16) by loosening two screws along top edge of tape drive cover.

(4) Locate the fuse on the power supply module adjacent to the air filter (Figure 17).

(5) Remove the fuse holder: unscrew (counterclockwise) 1/4 turn and pull out gently.

(6) Remove old fuse from fuse holder; check fuse.

(7) If blown, discard old fuse and insert new fuse into holder.

(For 115V operation, use a 3-amp, 3AG, slo-blo fuse; for 220V/240V operation, use a 1.5-amp, 5X20, slo-blo fuse; both should be 250VAC-rating type.)

(8) Push fuse holder into position gently and then turn clockwise 1/4 turn.

(9) Return the tape drive to its operating position.

Processor Module

Replacing the Processor

A problem on the backplane (rather than with power supply or
printed circuit assemblies) requires replacing the entire
processor.

CAUTION:

Removal of the processor is a two-person task, since the
unit weighs 40 lb. Do not attempt this procedure alone.

To replace the processor:

(1)   Perform System Shutdown procedure (see "Chapter 3 --
      Operation").

(2)   Turn system power switch OFF and unplug system power
      cord.

(3)   Remove the processor front panel.

(4)   Remove the system rear-access panel.

(5)   Remove the system side-access panel.

(6)   Remove the processor side panel (six screws).

(7)   Remove all disk and tape interface cables through the
      side access by releasing the ejectors on the sides of
      the cable connectors.

(8)   Disconnect all terminal, printer and communication
      cables from the rear panel of the processor.

(9)   Unplug the processor power cord from the power
      distribution unit.

(10) Unplug the power cord from the processor; roll the
      cords up gently and secure with rubber bands.

(11) Undo the four fasteners on the front of the rack.

(12) Slide the processor out from the front.

(13) Push the slide release latches.

(14) Lift out the processor.

(15) Unpack the new processor; place the old processor in
     the shipping container for return to Plexus. Be sure to
     include a Failure Report (Appendix G).

(16) To install the new processor, reverse the above steps.

Replacing the Processor Fuse

If the system will not power up, first assure that all installation procedures have been properly accomplished. If so, then check the processor fuse:

(1) Perform System Shutdown procedure (see "Chapter 3 -- Operation").

(2) Turn system power switch OFF and unplug system power cord.

(3) Remove the system rear-access panel.

(4) Locate the fuse at the rear of the processor adjacent to the processor power switch (Figure 10).

(5) Remove the fuse holder: unscrew (counterclockwise) 1/4 turn and pull out gently.

(6) Remove old fuse from fuse holder; check fuse.

(7) If blown, discard old fuse and insert new fuse into holder.

     (For 115V operation, use a 6.25-amp, 3AG, slo-blo fuse; for 220V/240V operation, use a 3-amp, 5X20, slo-blo fuse; both should be 250VAC-rating type.)

(8) Push fuse holder into position gently and then screw clockwise 1/4 turn.

(9) Reattach the system rear-access panel.

(10) Plug in the system power cord and turn the system power switch to ON.

Replacing Processor Power Supplies

The three processor power supplies are +12-volt, -12-volt and +5-volt. Use the following procedures to replace any of these power supplies, but note differences described:

(1)   Perform System Shutdown procedure (see "Chapter 3 -- Operation").

(2)   Turn system power switch OFF and unplug system power cord.

(3)   Remove the processor front panel.

(4)   Remove the four retaining screws on the processor.

(5)   Pull out the processor on its rack slides.

(6)   Remove the five screws on the processor top cover.

(7)   Locate the three processor power supplies (Figure 19).

(8)   An AC shield plate covers the AC connections; remove the shield plate from the power supply to be replaced.

(9)   Remove the two AC wires (brown and blue) on the power supply to be replaced.

(10)   For replacing +12, remove the +12 wire (red) and the ground power wire (black); undo the four hex nuts on the plate.

       For replacing -12, remove the -12 wire (blue) and the ground power wire (black); undo the two hex nuts on the plate.

       For replacing +5, remove the ground power wire (green), the two 5-volt wires (yellow), the 5-volt return wire (black) and the power-fail interrupt wire (brown, labeled PF); undo the four hex nuts from the top of the power supply.

(11)   Lift out the power supply.

(12)   Unpack the new power supply from its shipping container, retaining the container for return shipment.

(13)   Repack the old power supply in the shipping container and return to Plexus with a Failure Report (Appendix G).

(14) To install the new power supply, reverse above steps, but first read the following CAUTION:

CAUTION:

Upon installing a new power supply, you must:

(1) Remove all the processor pca's.

(2) Turn the system power switch ON.

(3) Check the voltage of **all** power supplies at the five test points on the pca backplane (see Figure 19 for location, Fig 20 for detail).

(4) Turn the system power switch OFF.

(5) Replace the pca's.

This sequence is imperative! Wrongly wiring one power supply and then powering the system could destroy all the processor pca's.

Replacing the Processor Battery

The system clock is maintained by a 3.6-volt battery mounted to
the processor backplane (Figure 20).   Accuracy of the system
clock is vital to file system integrity; each time you bring up
your system, verify the accuracy of the system time. Should
discrepancies occur, reset the system time using the UNIX tool
described in DATE(1).

CAUTION:

To keep the processor battery charged, run the system for
at least 48 hr, once every 60 days. Should the processor
battery lose its charge due to extended system shutdown,
it will recharge once the system is up and running;
remember to reset the system clock, however, before per-
forming operations on the system.

As a preventive maintenance procedure, the processor battery
should be replaced every two years.

Replacing Processor Printed Circuit Assemblies

To replace a processor printed circuit assembly (pca):

(1)   Perform System Shutdown procedure (see "Chapter 3 -- Operation").

(2)   Turn system power switch OFF and unplug system power cord.

(3)   Remove the processor front cover (pops off).

(4)   Remove the four screws securing the processor chassis to the system enclosure.

(5)   Pull the processor drawer out fully on its slides.

(6)   Remove the processor side-access panel (six screws) (Figure 19).

(7)   Disconnect all cables from the pca you wish to replace, tagging each cable to facilitate proper reinstallation. (To disconnect a cable, flip the cable ejector lever at either end of the cable header and pull the cable connector straight out of the header.)

        NOTE: Cables and mating connectors are keyed to prevent wrong pin connections. On all Plexus cables, pin 1 is indicated by a triangle on the cable connectors; most Plexus cables also indicate pin 1 by a red stripe at the pin-1 edge of the cable. Match this to pin 1 of the header, which is also marked with a triangle.

(8)   Remove the pca by pulling the card ejector levers at each corner of the pca and then pulling the pca straight out of the cardcage.

(9)   Take the new pca out of its shipping container and compare it to the old to verify that configuration and jumper positions on the new pca correspond to those on the old pca.

(10)   Place the old pca in the container for return to Plexus with a Failure Report (Appendix G), making copies for your use.

(11)   To insert the new pca, reverse the above steps.

APPENDIX A

INTERFACE PIN ASSIGNMENTS
FOR TERMINAL AND PRINTER PORTS

SERIAL CONNECTOR SIGNALS (RS232C STANDARD)

Pin #	Description	Direction
1	(not used)	
2	Transmitted data	TO dce*
3	Received data	FROM dce
4	Request to send	TO dce
5	Clear to send	FROM dce
6	Data set ready	FROM dce
7	Signal ground (common return)	(not applicable)
8	Carrier detect	FROM dce
9	(not used)	
10	(not used)	
11	Speed select	TO dce
12	(not used)	
13	(not used)	
14	(not used)	
15	Transmit clock	FROM dce
16	(not used)	
17	Receive clock	FROM dce
18	(not used)	
19	(not used)	
20	Data terminal ready	TO dce
21	(not used)	
22	(not used)	
23	(not used)	
24	(not used)	
25	(not used)	

*dce = data communication equipment

PARALLEL CONNECTOR SIGNALS (CENTRONICS STANDARD)

Signal Name	Interface Pin #	Source	Description
DATA STROBE/	1,19	Processor	Pulse clocks data to printer
DATA 1	2,20	Processor	LSB)
DATA 2	3,21	Processor	)
DATA 3	4,22	Processor	)
DATA 4	5,23	Processor	) LO = 0
DATA 5	6,24	Processor	) HI = 1
DATA 6	7,25	Processor	)
DATA 7	8,26	Processor	)
DATA 8	9,27	Processor	MSB)
ACKNLG/	10,28	Printer	Acknowledges receipt of character or end of function
BUSY	11,29	Printer	Printer busy
PE	12	Printer	Out of paper
SLCT	13	Printer	Printer selected
Gnd	14	Printer	Signal ground
Gnd	16		Signal ground
INPUT PRIME/	31*,30	Processor	Initializes printer
FAULT/	32	Printer	Printer fault

NOTE: Second pin number (number after comma) indicates the ground wire of a twisted pair return.

/ Indicates negative true (logical NOT)

* Do not connect pin 31

APPENDIX B

BOOTING THE OPERATING SYSTEM

Booting V7 UNIX

> NOTE: This section is specific to V7 UNIX; to boot Sys3
> UNIX, see the next section -- "Booting Sys3 UNIX".

After the selftest has completed, the system console displays a
message such as:

    PLEXUS SELFTEST COMPLETE

The bootstrap program is then automatically executed from the V7
UNIX boot PROM. This firmware allows V7 UNIX or any standalone
program to be booted from disk or tape (see Appendix C -- Release
Tape Format). When this primary boot starts execution, the
system console displays:

    Boot--
    :

To bring up V7 UNIX from the disk, type <return>. This accesses
the default parameters from the disk and displays (on the system
console) the name of the default program to be booted, typically:

    : is(0,0)/v7

This indicates that the V7 UNIX operating system is being brought
up from disk. After approximately 30 sec to completion, the
system console will display the operating system name and
revision number, the amount of user memory available in the
system and the single-user prompt (#):

    PLEXUS V7
    rev = x.x
    mem = xxxxxx

    #

These messages indicate that:

> *   the bootstrap program has been executed from the
>   processor PROM

* Plexus V7 UNIX has been loaded from the system disk and

* the V7 UNIX operating system is ready for use.

At this point, any system functions that require full V7 UNIX
resources can be run. To bring up the system in multi-user mode,
type <ctrl>d. This will normally print a login message at each
terminal within 3-5 min, depending upon number of ICPs in the
system.

Booting Sys3 UNIX

> NOTE: This section is specific to Sys3 UNIX to boot V7
> UNIX, see the previous section -- "Booting V7 UNIX".

After the selftest has completed, the system console displays a
message such as:

    PLEXUS SELFTEST COMPLETE

The bootstrap program is then automatically executed from the
Sys3 UNIX boot PROM. This firmware allows Sys3 UNIX or any
standalone program to be booted from disk or tape (see Appendix C
-- Release Tape Format). When this primary boot starts
execution, the system console displays:

    Boot--
    :

To bring up Sys3 UNIX from the disk, type <return>. This
accesses the default parameters from the disk and displays (on
the system console) the name of the default program to be booted,
typically:

    : is(0,0)sys3

This indicates that the Sys3 UNIX operating system is being
brought up from disk. After approximately 30 sec to completion,
the system console will display the operating system name and
revision number (SYS3/x.x), the number of users supported by the
software (sys3.xx), the amount of memory in the system (real
mem), the amount available for user processes (avail mem), and
the single-user prompt (#):

    SYS3/x.x: sys3.xx
    real mem = xxxxxx bytes
    avail mem = xxxxxx bytes
    sys3
    single user
    #

At this point, any system functions that require full Sys3 UNIX
resources can be run. To bring up the system in multi-user mode,
type:

    /etc/init 2

Messages reporting the startup of process accounting, of cron,
and the initialization of ICP should appear on the console. The

last two messages should be:

    multi-user
    type ctrl-d

Respond by typing:

    <ctrl>d

The message:

    login:

should appear on the console as well as on all active terminals within 1-3 min, depending upon number of ICPs in the system.

For details of the boot program, see "Appendix D -- Standalone Programs."

APPENDIX C

RELEASE TAPE FORMAT

An operating system release tape contains the software needed to bring up a full functioning file system. The tape consists of multiple files:

```
File  0:  help (including tape contents)
File  1:  boot
File  2:  V7 or Sys3
File  3:  dformat
File  4:  mkfs
File  5:  restor
File  6:  icheck
File  7:  dd
File  8:  fbackup
File  9:  od
File 10:  dconfig
Files 11-19:  Standalone programs specified in File 0 (help)
File 20:  Release File System (V7 or Sys3)
File 21:  Addenda 1 (if applicable)
File 22:  Addenda 2 (if applicable)
```

Blocking Factor -- V7 Release Tapes

Files 0-19 are blocked with 512 bytes (1 block) per record. Files 20-EOT (end of tape) are blocked with 10240 bytes (20 blocks) per record.

Blocking Factor -- Sys3 Release Tapes

Files 0-19 are blocked with 1024 bytes (2 blocks) per record, except for file 1 (boot) which is blocked with 512 bytes per record. Files 20-EOT (end of tape) are blocked with 10240 bytes (20 blocks) per record.

Tape Format

Files 0-19 are straightforward binary and ASCII files. File 20 is in dump format. Files 21-EOT (if applicable) are in tar format.

For more information on the standalone programs (files 0-19) see "Appendix D -- Standalone Programs."

APPENDIX D

V7 UNIX STANDALONE PROGRAMS

NOTE: This Appendix is specific to V7 UNIX; for Sys3
UNIX, see Appendix K -- Sys3 UNIX Standalone Programs.

Certain standalone programs must be run before booting V7 UNIX.
They perform a number of tasks necessary to allow V7 UNIX to run
on a new system. Catastrophic system errors may also require
that these programs be run.

Pathnames are of the form:

    device (number, offset)

where

    device = a device specifier -- "rm" (tape) or "is" (disk)
    number = a device number (from 0 to 3) and
    offset = starting point (in files for tape, blocks for disk).

Example: rm(0,0)

Standalone programs can all be executed from the V7 UNIX release
tape and in some cases can also be executed from the disk. To
execute a standalone program from the release tape, only the
program name must be typed in response to the boot prompt. For
example:

    Boot --
    : mkfs

However, to execute a standalone program from disk requires the
user to specify a complete pathname for the program. For example:

    Boot --
    : is(0,0)/stand/mkfs

In this example, "is" indicates a disk device, "(0,0)" indicates
disk unit 0 at offset 0, and "/stand/mkfs" indicates the pathname
of a file within a file system starting at this location.

Upon completion, standalone programs print "Exit" followed by a
value. The value "0" indicates that the program completed
normally.

Generally, the standalone programs prompt for any parameters needed. The following pages detail each of the standalone programs:

help -- Gives information about the release tape and use of standalone programs.

boot (secondary boot) -- Prompts for pathname, loads program into memory and executes it.

v7 -- A binary copy of the V7 UNIX operating system.

dformat (disk format) -- Formats a disk drive, prompts for format information.

mkfs (make file system) -- Creates a bare file system. Prompts for size and location. See MKFS(1).

restor (restore file system from dump tape) -- Prompts for tape name and file system. See RESTOR(1).

icheck (file system consistency check) -- Prompts for file system name. See ICHECK(1).

dd (device-to-device copy program) -- Can read out of file systems. See DD(1).

fbackup (fast backup) -- Does a quick image copy from disk to tape or from tape to disk.

od (octal dump) -- Dumps a file to the screen in octal or hex format. Prompts for arguments. See OD(1).

help (Release Tape Information)

Information about the release tape is displayed on the system
console by this program. It is self-explanatory and makes use of
menus to allow the user access to more detailed information.   To
use the help program, load the release tape into tape drive 0
and, in response to the boot prompt, type either **?** or **help.**

boot (Secondary Boot)

This standalone program is not normally used, since the primary
boot in firmware performs the same function.

v7 (V7 UNIX Operating System)

Under normal circumstances, this copy of the V7 UNIX operating
system is never accessed. It is included only as a last-resort
backup in case all other copies have been lost or destroyed.

dformat (Disk Format, Spare Tracks and Initialize)

(NOTE: Before initiating this procedure, have available a list of
the bad sectors on the system disk drive. Plexus supplies this
list with each system shipped.   If this list is not readily
available, the information can be obtained from the
manufacturer's sticker affixed to the disk drive top.)

To initiate disk formatting, first ensure that a Plexus V7 UNIX
release tape is properly installed in the tape drive. The
console will prompt as follows (respond as indicated in **bold**):

```
    Boot --
    : dformat

    Standalone dformat --
    Format, spare, or initialize the disk? [fsi]:              f
    Unit? [0-3]:                                               0
    Total number of cylinders? [3-1024]:             ·       823
    Number of heads on removable? [0-24]:                      0
    Number of heads on fixed? [0-24]:                   5 or 10*
    Data bytes per sector? [32-1024]:                        512
    Sectors per track? [18-108]:                              35
    Number of alternate cylinders? [0-50]:                     7
    Interleave factor? [1-10]:                                 4
    User pattern? [8 hex digits]:                      a5a5a5a5
    Defective tracks on fixed?(cyl,head) [0-822,0-x]:
```

At this point, enter each defective track by typing the **cylinder
number** followed by a **comma** and then the **head number** followed by a
<return>. When all defective tracks have been entered using this
format, type **<return>** again, to continue formatting:

```
    File system blocksize? [512-8192]:                      1024
    Default boot name?:                              is(0,0)/v7
```

This step causes a delay of 5-10 min, depending upon disk size.
During this time, the system is formatting the disk according to
the user specifications just provided. Upon completion, the
system console displays:

```
    Disk formatted and initialized successfully!
    Exit 0

    Boot --
    :
```

---

    * 5 for 72-megabyte disks; 10 for 145-megabyte disks.

mkfs (Make a File System)

This standalone program constructs a file system according to
user-specified parameters. The program prompts for all
parameters, including file system size, device, offset and file
length.

For example, to make a file system that is 20000 blocks long
(1024-byte blocks), on disk unit 0, at offset 0, respond to the
boot program as follows (user response is in bold):

        Boot --
        : **mkfs**

        Standalone mkfs --
        File system size: **20000**
        File system: **is(0,0)**
        isize = 12800
        m/n = 3 500
        Exit 0

        Boot --
        :

Note that the mkfs on the V7 UNIX release tape was used. If the
V7 UNIX file system is intact, it would also be possible to use
the standalone mkfs from the disk; this could be done by typing:

        is(0,0)/stand/mkfs

in response to the boot prompt.

restor (Restore a File System from Dump Tape)

(NOTE: Before attempting to use the standalone restor program, the standalone mkfs program must be run.)

To restore a file system from dump tape, after making a file system, make sure the release tape is loaded and type **restor** in response to the boot prompt. Wait for restor prompts and then remove the release tape and load the dump tape before responding to the restor prompts. The restor standalone program will then prompt for the name of the dump tape and the disk location of the file system.

For example, to restore the V7 UNIX file system from a tape on tape unit 0 (at offset 20) to disk unit 0 (at offset 0), respond as indicated in **bold**:

        Boot --
        : **restor**

After typing **restor**, wait for restor prompts; remove release tape and load dump tape before responding to the restor prompts.

        Standalone restor --
        Tape? **rm(0,20)**
        Disk? **is(0,0)**
        Last chance before scribbling on disk. **<return>**
        End of Tape
        Exit 0

        Boot --
        :

icheck (File System Consistency Check)

This standalone program prompts for the pathname of a file system
on disk and verifies file system integrity by doing a consistency
check, reporting any inconsistencies it finds. A typical check
of a file system on disk unit 0 starting at offset 0, assuming a
release tape in tape unit 0, might look as follows (with user
response indicated in bold):

        Boot --
        : icheck

        Standalone icheck --
        File: is(0,0)
        is(0,0):
        files 2507 (r=2309,d=140,b=17,c=37)
        used 26500 (i=577,ii=36,iii=0,d=25855)
        free 11932
        missing 0
        Exit 0

        Boot --
        :

In this example:

        "files" indicates the number of files in the file system,
        "used" indicates the number of blocks of data used,
        "free" indicates the number of remaining blocks and
        "missing" indicates number of inconsistencies identified.

dd (Copy a File from Device to Device)

This program is modeled after DD(1), but performs only a subset
of the DD(1) functions. The available parameters are printed as
prompts and should be answered accordingly. It is possible to
copy a file system out of a file system onto a fixed location on
the disk or tape, but copying into a file system is not
permitted.

For example, to copy a file system named /testfile that is 20
blocks long (512-byte blocks) from a file system on disk drive 0
starting at offset 44000 to a tape in tape drive 0 at offset 0,
respond to the boot prompt as indicated in bold:

```
    Boot --
    : dd

    Standalone dd --
     if: is(0,44000)/testfile
     of: rm(0,0)
     count: 20
     bs: 512
     skip: 0
     seek: 0
    20 blocks copied successfully!
    Exit 0

    Boot --
    :
```

fbackup (Fast Disk/Tape Backup and Restor)

This program copies from disk to tape or from tape to disk while
using the tape in streaming mode. It blocks files at 32 (512-
byte) blocks per record.

For example, to copy a file system that is 20000 blocks long
(512-byte blocks), starting at offset 44000 on disk drive 1, onto
the tape in tape unit 0, respond to the boot prompt as indicated
in **bold**:

        Boot --
        : **is(0,0)/stand/fbackup**

NOTE: The pathname "is(0,0)/stand/fbackup" indicates the location
of the fbackup program (disk 0). This program will then prompt
for the location of the file system (in this example, disk 1).

        Standalone fbackup --
        Backup to tape or Restore from tape? [br]: **b**
        Disk unit? [0-3]: **1**
        Tape unit? [0-3]: **0**
        Starting disk block number for backup/restore? [0,111719]: **44000**
        Number of blocks in backup/restore? [1,67720]: **20000**
        Disk reads complete!
        Backup to tape completed successfully
        Exit 0

        Boot --
        :

This tape can be restored using the fbackup program or by using
the V7 UNIX command DD(1) with **bs=32b.**

od (Octal Dump)

This program is modeled after OD(1), but works as a standalone program from the tape. It dumps a file to the screen in octal or hex format, according to the arguments provided by the user.

For example, to see a hex dump of a file on disk 0, at offset 0, and named "xx/yy", respond to the boot prompt as indicated in **bold**:

```
Boot--
: od

Standalone od --
 arg[1]: -x
 arg[2]: is(0,0)xx/yy
 arg[3]:
```

To the last prompt, respond with a <cr> (null argument). The program will begin dumping the file to the screen according to the arguments provided and as described in OD(1). When the file has been completely dumped to the screen, a boot prompt will be issued:

```
Boot --
:
```

APPENDIX E

SELFTEST ERRORS

Many P/40 system error messages are self-explanatory. However, should the Plexus P/40 system display error messages which require further details, contact Plexus technical support personnel at 408/988-1755.

Future editions of this manual will contain a list of the boot, selftest and system error messages and their meanings.

APPENDIX F

WARRANTY SERVICE PROCEDURE

Plexus products carry a warranty as described in "Terms and Conditions of Sale." For instructions on warranty repair, call Plexus Field Service at 408/988-1755.

APPENDIX G

FAILURE REPORT

To return any P/40 component to Plexus for repair, please complete this form and send it with the component to:

         Plexus Computers Inc
         2230 Martin Ave, Santa Clara, CA 95050
         Attn: Customer Returns

To aid in diagnosing the problem, please include as much information as possible about the conditions under which failure occurred. For example, include all diagnostic information which is displayed on the terminal screen after memory errors.

Date ___/___/____ (mo/day/yr)

Your Name   _____

Company   _____

Address   _____

City/State/Zip   _____

Phone   _____

Description of Your
Plexus Equipment   _____

                     _____

Component(s) returned:

Problem symptoms:
(Use back of this sheet or additional sheets as necessary)

APPENDIX H

BIBLIOGRAPHY OF RELATED PUBLICATIONS

The Bell System Technical Journal
Jul-Aug 1978, vol 57, no 6, part 2 (ISSN 0005-8580)

Special issue devoted entirely to the UNIX Time-Sharing System family of computer operating systems developed at Bell Laboratories.

The C Programming Language, B W Kernighan, D M Ritchie
Prentice-Hall Inc, 1978 (ISBN 0-13-110163-3)

The reference manual for C, the primary language for the UNIX operating system.

A User Guide to the UNIX System, R T Thomas, J Yates
McGraw-Hill Inc, 1982 (ISBN 0-918118-18-2)

Introduces the novice to the UNIX operating system, using examples and tutorials to provide training for the most useful commands.

Using the UNIX System, R Gauthier
Reston Publishing Co (Prentice-Hall), 1981 (ISBN 0-8359-8164-9)

Written for people with some knowledge of computer sciences but with no knowledge of the UNIX system.

Plexus P40 Engineering Manual
Plexus Computers Inc, 1982   (Plexus Publication #5017)

Provides a board-by-board description of the hardware functions of the Plexus P/40 computer system down to the component level. Intended for use by engineers and technicians as a design and repair aid.

Plexus 14-in. Winchester Disk Drive Manual
Plexus Computers Inc, 1982   (Plexus Publication #5011)

    In ten sections, this manual addresses customer engineers
    directly involved with maintaining these Winchester SMD disk
    drives.

Plexus 9-Track Tape Drive Manual
Plexus Computers Inc, 1982   (Plexus Publication #5012)

    Describes the   Cipher   streaming   tape   drive.   Cites
    specifications   and   clarifies   unpacking,   inspection,
    installation, operation, interfacing and maintenance.

Plexus V7 UNIX Programmer's Manual -- vol 1
Plexus Computers Inc, 1982   (Plexus Publication #5005)

    Describes in concise reference terms the available   features
    of   the   UNIX   system,   without   perspective   or   tutorial
    information.

Plexus V7 UNIX Programmer's Manual -- vol 2 (A and B)
Plexus Computers Inc, 1982   (Plexus Publication #s 5006 and 5007)

    These two volumes contain supplements to the information   in
    vol 1, with documents grouped into basics, editing, language
    tools,   document   preparation   and   system   maintenance.
    Sections   on   Setting Up UNIX, The UNIX Time-Sharing System,
    UNIX Implementation, UNIX for Beginners,   UNIX   Programming,
    and UNIX Shell Introduction are useful in that order.

Z8000 Technical Manual
Zilog Inc, 1980   (Zilog Publication #00-2010-C0)

    This manual for the Z8000 microprocessor   presents   purpose,
    description,   architecture,   address   spaces,   operation,
    addressing   modes,   instruction   set,   exceptions,   refresh,
    external interface and useful appendixes.

APPENDIX I

BOARD-LEVEL CONFIGURATION OPTIONS

Printed-circuit assemblies in the Plexus P/40 contain a number of user-selectable options which must be set to match equipment characteristics. Board-level options are implemented on switchpaks or jumper networks. The options, by pca, are:

PCA	Option
MEMORY	Board Population
	Board Address Boundary
PROCESSOR	Default Baud Rate for System Console
	Autoboot
ICP	Wakeup Address / Port Address
	Selftest Diagnostics
	PROM Size
	Multibus Interrupt Level
	Carrier Detect Signal / Clear to Send Signal
	Transmit Clock / Receive Clock

This appendix contains a complete description of each option and its implementation.

Memory Board Options

Board Population

Plexus memory boards are available in two versions: 16K or 64K
RAM. Memory boards using 16K RAMs contain 256K bytes (1/4
megabyte) of memory, while memory boards using 64K RAMs contain a
maximum of 1024K bytes (1 megabyte) of memory.

The 64K-RAM memory boards are also available in versions
depopulated to 1/2-megabyte or to 1/4-megabyte. Board population
must be specified on each 64K-RAM board.

This is accomplished via a 16-pin jumper network located between
connector P1 and connector P2. On this jumper network, the 16
pins are arranged as eight pin-pairs labeled J1 through J8.

Factory-installed jumpers on this network indicate the population
of the 64K-RAM memory board -- 1/4, 1/2 or 1 megabyte -- and
should be altered only if the board population is altered.   Pin-
pairs are jumpered using female two-pin jumpers.

Verify correct jumpering according to the following:

Board Population	Pin-Pairs Jumpered
1/4 megabyte	J2, J4, J6, J8
1/2 megabyte	J2, J4, J5, J7
1 megabyte	J1, J3, J5, J7

Board Address Boundary

Each memory board contains a switchpak which is used to specify
the first address on that board -- the address boundary. On
64K-RAM boards, the switchpak is designated SW1; on 16K-RAM
boards it is designated S1.

The switch-settings are not optional; they are factory-set and
should be changed only if a memory board is moved from one
logical address to another. For these switches, ON = 1 and OFF =
0.

On all memory boards, switches carry the following designations
and are assigned the following meanings:

```
      Switch
    Designation
    -----------
    64K   16K    Legend         Description
    ---   ---    ------    ------------------------

     1     8     A11      Board address (LSB)
     2     7     A12        "        "
     3     6     A13        "        "
     4     5     A14        "        "
     5     4     A15      Board address (MSB)
     6     3     DIS      Disable  (default = OFF)
     7     2     ---      Reserved (default = OFF)
     8     1     ---      Reserved (default = OFF)
```

Switches designated A11-A15 on the legend specify an address
boundary according to the equation:

$$S \times 256K = A$$

where S = switch settings (read as a binary number)
      A = address boundary.

For example, 00100 (that is, binary 4) would yield:

$$4 \times 256K = 1024K \quad \text{(or a 1-megabyte boundary)}.$$

Correct switch settings for address boundary are illustrated
below.

64K-RAM Memory Boards -- Verify correct address boundary switch settings for 64K-RAM memory boards as follows. For fully populated boards (1 megabyte per board):

```
                 A11 A12 A13 A14 A15
                +--------------------------------------+
Board 1         |   ON                3                |
(64K)           |   OFF    1    2         4   5   6   7   8 |  = 00100 = 4
                +--------------------------------------+
```

(4 x 256K = 1024K or 1-megabyte boundary)

```
                +--------------------------------------+
Board 2         |   ON                    4            |
(64K)           |   OFF    1    2    3         5   6   7   8 |  = 01000 = 8
                +--------------------------------------+
```

(8 x 256K = 2048K or 2-megabyte boundary)

```
                +--------------------------------------+
Board 3         |   ON                3   4            |
(64K)           |   OFF    1    2             5   6   7   8 |  = 01100 = 12
                +--------------------------------------+
```

(12 x 256K = 3072K or 3-megabyte boundary)

```
                +--------------------------------------+
Board 4         |   ON                        5        |
(64K)           |   OFF    1    2    3    4        6   7   8 |  = 10000 = 16
                +--------------------------------------+
```

(16 x 256K = 4096K or 4-megabyte boundary)

```
where ON = 1
      OFF = 0
      A15 = MSB (switch 5)
      A11 = LSB (switch 1).
```

The 64K-RAM memory boards are also available in depopulated versions (1/2- or 1/4-megabyte per board).

The address boundary of a memory board will not be affected by its being depopulated, but the address boundary of the next memory board will be affected. Therefore, for systems in which a depopulated board is installed only as the last board in the set, the above boundaries will still apply.

However, if a depopulated board is installed elsewhere, the address boundary of the next memory board will not increment by a full 1024K bytes. Instead, it will increment only 512K bytes for a 1/2-megabyte board or 256K bytes for a 1/4-megabyte board. Use switch 2 to implement 1/2-megabyte increments and switch 1 to implement 1/4-megabyte increments.

For example, if board 3 is depopulated to 1/2-megabyte, then the address boundary for board 4 would be at 3-1/2 megabytes, set as follows:

```
                     A11 A12 A13 A14 A15
             +-----------------------------------------+
Board 4      |   ON            2   3   4               |
(64K)        |   OFF       1               5   6   7  8 |  = 01110 = 14
             +-----------------------------------------+
```

(14 x 256K = 3584K or 3-1/2 megabyte boundary)

If board 3 is depopulated to 1/4-megabyte, then the address boundary for board 4 would be at 3-1/4 megabytes, set as follows:

```
             +-----------------------------------------+
Board 4      |   ON        1       3   4               |
(64K)        |   OFF           2           5   6   7  8 |  = 01101 = 13
             +-----------------------------------------+
```

(13 x 256K = 3328K or 3-1/4 megabyte boundary)

where ON = 1
      OFF = 0
      A15 = MSB (switch 5)
      A11 = LSB (switch 1).

16K-RAM Memory Boards -- Verify correct address switch settings for the 16K-RAM memory boards (256K bytes per board) as follows:

```
                              A15 A14 A13 A12 A11
                   +-------------------------------------+
Board 1            |  ON                      6          |
(16K)              |  OFF       1   2   3   4   5     7   8 |   = 00100 = 4
                   +-------------------------------------+

       (4 x 256K = 1024K or 1-megabyte boundary)

                   +-------------------------------------+
Board 2            |  ON                      6       8   |
(16K)              |  OFF       1   2   3   4   5     7     |   = 00101 = 5
                   +-------------------------------------+

       (5 x 256K = 1280K or 1-1/4 megabyte boundary)

                   +-------------------------------------+
Board 3            |  ON                      6   7       |
(16K)              |  OFF       1   2   3   4   5         8   |   = 00110 = 6
                   +-------------------------------------+

       (6 x 256K = 1536K or 1-1/2 megabyte boundary)

                   +-------------------------------------+
Board 4            |  ON                      6   7   8   |
(16K)              |  OFF       1   2   3   4   5           |   = 00111 = 7
                   +-------------------------------------+

       (7 x 256K = 1792K or 1-3/4 megabyte boundary)
```

where ON = 1
      OFF = 0
      A15 = MSB (switch 4)
      A11 = LSB (switch 8).

NOTE: 16K-RAM boards are NOT available in depopulated versions.

Processor Board Options

The processor board contains a switchpak which is used to specify
the default baud rate for the system console. For location of
the switchpak, see Figure 21.

These switches carry the following designations and are assigned
the following meaning:

S4	S3	S2	S1	Baud Rate	
0	0	0	0	110	
0	0	0	1	300	
0	0	1	0	600	
0	0	1	1	1200	
0	1	0	0	2400	
0	1	0	1	4800	
0	1	1	0	9600	(Plexus default)
0	1	1	1	19200	

```
    where ON = 1
         OFF = 0
          S3 = MSB
          S1 = LSB
          S4 = autoboot (enabled when S4˙is ON).
```

To change the system console default baud rate, set switches 1-3
according to the above table (as illustrated below).

NOTE: The default baud rate for each terminal on the system is
software-selectable. To change the baud rate for any terminal,
use the "stty" command described in STTY(1).

Switch settings to specify system console default baud rate:

```
+----------------------------+
|   ON                       |
|   OFF      S1   S2   S3   S4 |   = 0000 =    110 baud
+----------------------------+


+----------------------------+
|   ON       S1              |
|   OFF           S2   S3   S4 |   = 0001 =    300 baud
+----------------------------+


+----------------------------+
|   ON            S2         |
|   OFF      S1        S3   S4 |   = 0010 =    600 baud
+----------------------------+


+----------------------------+
|   ON       S1   S2         |
|   OFF                S3   S4 |   = 0011 =   1200 baud
+----------------------------+


+----------------------------+
|   ON                 S3    |
|   OFF      S1   S2        S4 |   = 0100 =   2400 baud
+----------------------------+


+----------------------------+
|   ON       S1        S3    |
|   OFF           S2        S4 |   = 0101 =   4800 baud
+----------------------------+


+----------------------------+
|   ON            S2   S3    |
|   OFF      S1             S4 |   = 0110 =   9600 baud
+----------------------------+                  (Plexus default)


+----------------------------+
|   ON       S1   S2   S3    |
|   OFF                     S4 |   = 0111 =  19200 baud
+----------------------------+
```

```
where ON  = 1
      OFF = 0
       S3 = MSB
       S1 = LSB.
```

ICP Board Options

Wakeup Address / Port Address

Upon initialization, the ICP fetches beginning instructions from
its wakeup address. This wakeup address consists of a 16-bit
address in main memory specified by the binary values of U53 and
U68.   The high-order 8 bits are set by the 16-pin jumper network
located at U53 on the ICP (socketed to accept 2-pin male
jumpers).   The low-order 8 bits are set by the switchpak located
at U68 on the ICP. For locations, see Figure 22.

The high-order 8 bits are factory-set to 11111111 (X'FF'); all
pins remain open and are pulled high by pull-up resistors. This
factory setting is accomplished by NOT connecting any of the
eight pin-pairs at location U53 (NO JUMPER = 1, JUMPER INSTALLED
= 0).

The low-order 8 bits are factory-set to the appropriate ICP
assignment (1, 2, 3 or 4) and should be changed only if the ICP
assignment is changed. On all ICP boards, the eight DIP switches
at location U68 are labeled 1-8, with switch 1 setting the MSB
and switch 8 setting the LSB. Verify correct ICP wakeup address
settings as follows:

```
      +------------------------------------------+
ICP   |  ON           2   3   4   5   6   7   8  |
1     |  OFF    1                                |     = 10000000 = X'80'
      +------------------------------------------+


      +------------------------------------------+
ICP   |  ON           2   3       5   6   7   8  |
2     |  OFF    1               4                |     = 10010000 = X'90'
      +------------------------------------------+


      +------------------------------------------+
ICP   |  ON           2           4   5   6   7   8  |
3     |  OFF    1           3                    |     = 10100000 = X'A0'
      +------------------------------------------+


      +------------------------------------------+
ICP   |  ON           2               5   6   7   8  |
4     |  OFF    1           3   4                |     = 10110000 = X'B0'
      +------------------------------------------+
```

where ON = 0
      OFF = 1
switch 1 = MSB
switch 8 = LSB.

Selftest Diagnostic Mode

Each ICP board contains a switchpak at location U51 (Figure 22). The eight switches carry the following designations and are assigned the following meanings:

Switch	Description	Default Setting
1	Selftest Diagnostic Mode	ON
2	Not used	OFF
3	Not used	OFF
4	Not used	OFF
5	Not used	OFF
6	Not used	OFF
7	Not used	OFF
8	Not used	OFF

For general use, on all ICPs, the switches should be set to these default positions (as illustrated below):

```
           +----------------------------------------+
All        |   ON      1                            |
ICPs       |   OFF          2   3   4   5   6   7   8 |
           +----------------------------------------+
```
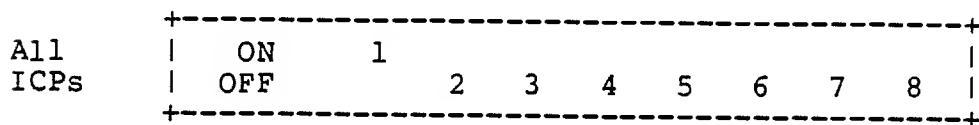
where ON = 0
      OFF = 1.

Of the eight switches at location U51 on the ICP, only switch 1 is used for selftest diagnostics. For normal operating mode, switch 1 should remain in the factory-set ON (0) position. When set to the OFF position, switch 1 is used to implement a selftest diagnostic routine; this routine should be used only by a Plexus-trained technician and then only until normal operating is to be resumed. Use of this switch is described in the online diagnostic listings.

PROM Size

All ICP boards carry a PROM in each of the four addressable
sockets (located at U88, U89, U90 and U91). While early ICPs
carried a 2K x 8 PROM in each of these four sockets, current ICPs
use a 4K x 8 PROM in each.

This 4K x 8 PROM size must be specified on two lines on the ICP.
This is accomplished via a pair of three-pin jumper networks
designated ROM 0 and ROM 1 on the ICP. For location, see Figure
22.

At ROM 0, centerpin A is jumpered to pin B:

```
+---------------+
|               |
|   O---O   O   |        ROM 0 Default = A to B
|               |
|   B   A   C   |
|               |
+---------------+
```
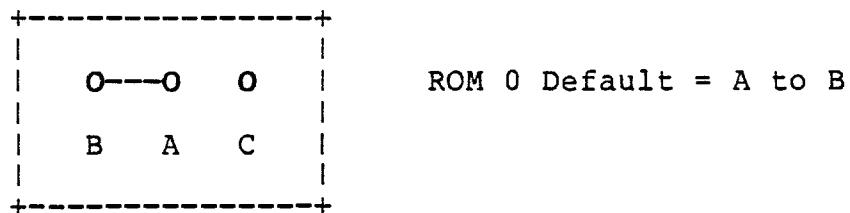

At ROM 1, centerpin A is jumpered to pin C:

```
+----------+
|          |
|   O  B   |
|          |
|   O  A   |        ROM 1 Default = A to C
|   |      |
|   O  C   |
|          |
+----------+
```
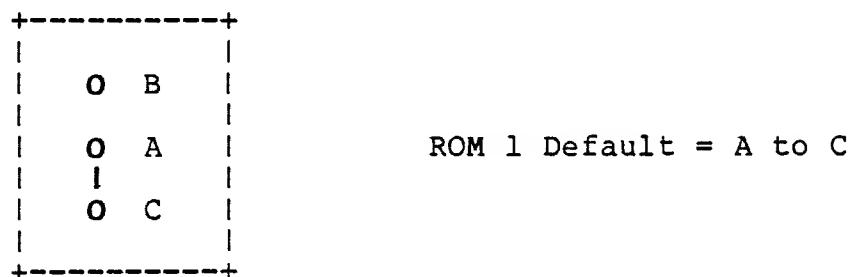

This default jumpering is accomplished at the factory using 2-pin
female jumpers. Factory jumpering should not be altered; it is
described here only for verification purposes.

Multibus Interrupt Level

Each ICP in a system must be assigned one of eight possible Multibus interrupt levels (0-7). The specific interrupt level is assigned by system software.

To be assigned the appropriate Multibus interrupt level, an ICP board must signal its identity -- ICP 1, 2, 3 or 4. This is accomplished via the jumper-pin network at location U17 (Figure 22). This 16-pin network is socketed to accept 2-pin male jumpers. The factory-set jumpering should be changed only if the ICP is moved to another slot.

Verify correct jumpering at jumper network U17 as follows:

        ICP 1   Jumper 5 to 12
        ICP 2   Jumper 6 to 11
        ICP 3   Jumper 4 to 13
        ICP 4   Jumper 2 to 15

NOTE: Early ICPs required that pin 15 be jumpered to either pin 5, 6, 4 or 2 to specify ICP 1, 2, 3 or 4, respectively. (This required variable-length jumper wires to implement.) However, current ICPs have pins 8-15 shorted together, which permits the 2-pin jumper scheme described above.

Carrier Detect Signal and Clear to Send Signal

Each ICP contains eight 10-pin jumper networks (one for each of the eight ports supported by the ICP). Each 10-pin jumper network is used to specify whether the port is connected to a terminal or to a modem. For locations, see Figure 22.

On the ICP legend, the eight 10-pin networks are labeled:

    C0 through C7 and
    S0 through S7

where

        C = Carrier Detect
        S = Clear to Send and
      0-7 = port number to which the jumper network relates.

Each 10-pin network consists of two horizontal rows of five pins each. All eight networks are factory-jumpered to indicate that a terminal is attached to the port. This is accomplished by installing two 2-pin female jumpers on each jumper network in the following positions:

```
        Sx   Sx   Sx   Cx   Cx
      +------------------------+
      |                        |
      |    O    O    O---O    O |          Default jumpering for
      |                   |    |             Carrier Detect and
      |    O    O    O    O    O |             Clear to Send
      |                        |
      +------------------------+
```
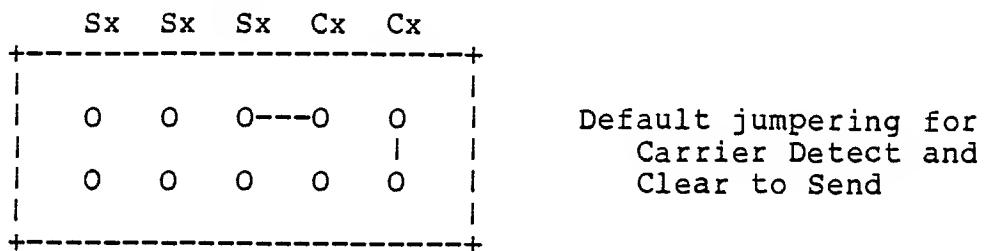
For purposes of discussion, refer to the above five pin-pairs as 1 through 5, reading from left to right.

If a modem were attached to a given port, both the jumpers shown above would be removed; the jumper on pin-pair 5 would be moved to pin-pair 4 (Carrier Detect) and the other jumper (Clear to Send) would be moved to pin-pair 1, 2 or 3, according to the following:

| | RS232C | RS232C |
Jumper	Pin	Signal Name
Pin-pair 1	20	Data Terminal Ready
Pin-pair 2	11	Secondary Request to Send
Pin-pair 3	4	Request to Send

NOTE: The Clear to Send signal is sent to the ICP when the

terminal is ready to accept input. Of the six pins in pin-pairs
1-3, the top three pins are shorted together and the bottom three
select the RS232C pin to which the Clear to Send signal connects.
Select only one per port.

Transmit Clock and Receive Clock

Each ICP contains 16 three-pin jumper networks (two for each of
eight ports) which are used to specify whether the port is
connected to a terminal or to a modem. For locations, see Figure
22.

On the ICP legend, the 16 three-pin networks are labeled:

     T0 through T7 and
     X0 through X7 .

where

        T = transmit clock
        X = receive clock and
      0-7 = port number to which the jumper network relates.

Each three-pin network consists of a centerpin A, flanked by pin
B and pin C. If a terminal is attached to the port, centerpin A
is jumpered to pin C. If a synchronous modem is attached to the
port, centerpin A is jumpered to pin B.

All 16 three-pin networks on the ICP are factory-jumpered to
indicate that a terminal is attached to the port. This is
accomplished by connecting each centerpin A to pin C, using a 2-
pin female jumper.

Do not alter the status of these jumpers, except to connect a
modem to a specific port on a given ICP.

APPENDIX J

SHUTTING DOWN THE OPERATING SYSTEM

Shutting Down V7 UNIX

>   NOTE: This section is specific to V7 UNIX; for Sys3 UNIX,
>   see the following section -- "Shutting Down Sys3 UNIX".

If it is necessary to bring down V7 UNIX, first make sure all
users are off the system. Then bring V7 UNIX to the single-user
mode and make sure the areas of the file system normally kept in
memory are updated on the disk.

To do this, you should be logged into the system console as root
and let everyone on the system know that the system is coming
down. This is possible using the command "/etc/wall" (where wall
= write to all users).   This sends to all logged in users a
"Broadcast Message ..." followed by your message.   For example,
type the following:

       /etc/wall
       System coming down in 3 min; please log off
       <ctrl>d

>   NOTE: <ctrl>d must be typed to indicate end of message.
>   It returns the root prompt to the console.

After users have had a chance to complete their session, the
process status command ("ps") should be run to ensure the system
is quiet:

       ps alx

Assuming the system is quiet, the disk update program "sync"
should then be executed to ensure file system integrity:

       sync

Next, to put the system into single-user mode (killing all other
active processes), execute:

       kill -1 1

For safety, "sync" should always be executed once again to ensure
file system integrity:

sync

At this point, the system may be powered off (system power switch), reset (reset button) or brought back up in multi-user mode (type **<ctrl>d,** which sends a login message to each terminal).

Shutting Down Sys3 UNIX

> NOTE: This section is specific to Sys3 UNIX; to shut down
> V7 UNIX, see the previous section -- "Shutting Down V7
> UNIX".

The System States

A Sys3 UNIX system is said to be running in a system "state" at
any given time. The state of the system defines a set of
background processes, including logins, that are spun off. The
files /etc/inittab and /etc/rc implement each state. In state 1,
only the system console is active. To change states, type:

/etc/init X

where X is the new state. Note that a process that is running in
the previous state is not terminated unless a t or k entry exists
in /etc/inittab for the process (see init(8)). When you change
to a new state, /etc/init first executes /etc/rc with the new and
old states as arguments. It then scans /etc/inittab for
procesess to spin off. The states supported in this release are:

    1 -- System console only active
    2 -- System console, all terminals, /etc/cron, /etc/openup,
         /etc/update and /etc/eccdaemon active
    7 -- System console and /etc/update active.

In state 1, the erase character is '#' and the kill line
character is '@'.

System Shutdown

To bring down Sys3 UNIX for any reason (eg, known power interruptions, system maintenance or repair, or corrupt file system) you must go from the current state to state 1 before powering the system down.   The sections below describe how to shut the system down when in the various states.

SHUTTING DOWN WHEN IN STATE 1

When in state 1, type:

ps -ef

to find out what processes are running. Kill all processes shown except those whose "COMMAND" is one of the following:

    swapper
    INIT 1
    /bin/sh (associated with the console)
    ps -ef (associated with the console)

Kill each process with kill -9. Next type:

sync

At this point, the system may be powered off or brought back to multi-user mode.

SHUTTING DOWN WHEN IN STATE 2

When in state 2, login to the console as root and type:

/etc/shutdown X

where X is a number representing the grace period. /etc/shutdown tells everyone logged in that the system will be shut down and that they have X number of seconds to kill their processes. Shutdown will then kill all processes in 60+X seconds. Shutdown does NOT kill processes associated with the console. Shutdown will ask the user several questions including:

    Busy out (push down) the appropriate phone lines for this system.
    Do you want to continue? (y or n): **y**
    Will a file save be done at this time? (y or n):**n**

    The system will be in state 1 after /etc/shutdown is executed.
    Now follow the directions in "Shutting Down When in State 1".

SHUTTING DOWN WHEN IN STATE 7

To go from state 7 to state 1, type:

/etc/init 1

This leaves some background processes running.
Now follow the directions in "Shutting Down When in State 1"

AUTOBOOT -- STATE 8

Sys3 UNIX can optionally boot itself from a system reset to
multi-user. If autoboot is enabled, the software
will:

1) boot the default system as set by the standalone
   commands dconfig or dformat, and

2) go into state 8, the autoboot state. In state 8,
   the file /etc/rc will do an /etc/fsck on the default
   disk devices and then go into state 2, multi-user.

To enable autoboot, set switch S4 of the processor board
switchpak to the ON position. See Appendix I -- Board-Level
Configuration Options.

APPENDIX K

Sys3 UNIX STANDALONE PROGRAMS

NOTE: This Appendix is specific to Sys3 UNIX; for V7
UNIX, see Appendix D -- V7 UNIX Standalone Programs.

Certain standalone programs must be run before booting Sys3 UNIX.
They perform a number of tasks necessary to allow Sys3 UNIX to
run on a new system. Catastrophic system errors may also require
that these programs be run.

Pathnames are of the form:

    device (number, offset)

where

    device = a device specifier -- "rm" (tape) or "is" (disk)
    number = a device number (from 0 to 3) and
    offset = starting point (in files for tape, sectors for disk).

Example: rm(0,0)

Standalone programs can all be executed from the Sys3 UNIX
release tape and in some cases can also be executed from the
disk. To execute a standalone program from the release tape,
only the program name must be typed in response to the boot
prompt. For example:

    Boot --
    : mkfs

However, to execute a standalone program from disk requires the
user to specify a complete pathname for the program. For example:

    Boot --
    : is(0,0)stand/mkfs

In this example, "is" indicates a disk device, "(0,0)" indicates
disk unit 0 at offset 0, and "stand/mkfs" indicates the pathname
of a file within a file system starting at this location.

Upon completion, standalone programs print "Exit" followed by a
value. The value "0" indicates that the program completed
normally.

Generally, the standalone programs prompt for any parameters needed. The following pages detail each of the standalone programs:

help -- Gives information about the release tape and use of standalone programs.

boot (secondary boot) -- Prompts for pathname, loads program into memory and executes it.

sys3 -- A binary copy of the Sys3 UNIX operating system.

dformat (disk format) -- Formats a disk drive, prompts for format information.

mkfs (make file system) -- Creates a bare file system. Prompts for size and location. See MKFS(1).

restor (restore file system from dump tape) -- Prompts for tape name and file system. See RESTOR(1).

icheck (file system consistency check) -- Prompts for file system name. See ICHECK(1).

dd (device-to-device copy program) -- Can read out of file systems. See DD(1).

fbackup (fast backup) -- Does a quick image copy from disk to tape or from tape to disk.

od (octal dump) -- Dumps a file to the screen in octal or hex format. Prompts for arguments. See OD(1).

dconfig -- Configures a disk with initialization information and the logical file system layout for Sys3 UNIX.

help (Release Tape Information)

Information about the release tape is displayed on the system console by this program. It is self-explanatory and makes use of menus to allow the user access to more detailed information. To use the help program, load the release tape into tape drive 0 and, in response to the boot prompt, type either **?** or **help.**

boot (Secondary Boot)

This standalone program is not normally used, since the primary boot in firmware performs the same function.

sys3 (Sys3 UNIX Operating System)

Under normal circumstances, this copy of the Sys3 UNIX operating system is never accessed. It is included only as a last-resort backup in case all other copies have been lost or destroyed.

dformat (Disk Format, Spare Tracks and Initialize)

CAUTION:

The following procedure will destroy all information on
the disk. Back up all files you do not want destroyed.

(NOTE: Before initiating this procedure, have available a list of
the bad sectors on the system disk drive. Plexus supplies this
list with each system shipped.   If this list is not readily
available,   the   information   can   be   obtained   from   the
manufacturer's sticker affixed to the disk drive top.)

To initiate disk formatting, first ensure that a Plexus Sys3 UNIX
release tape is properly installed in the tape drive. The
console will prompt as follows (respond as indicated in **bold**):

```
Boot --
: dformat

Standalone dformat --
Format, spare, or initialize the disk? [fsi]:            f
Unit? [0-3]:                                          is(0,0)
Total number of cylinders? [3-1024]:                     823
Number of heads on removable? [0-24]:                      0
Number of heads on fixed? [0-24]:           .       5 or 10*
Data bytes per sector? [32-1024]:                        512
Sectors per track? [18-108]:                              35
Number of alternate cylinders? [0-50]:                    20
Interleave factor? [1-10]:                  ·              4
User pattern? [8 hex digits]:                      a5a5a5a5
Defective tracks on fixed?(cyl,head) [0-822,0-x]:
```

At this point, enter each defective track by typing the **cylinder
number** followed by a **comma** and then the **head number** followed by a
<return>. When all defective tracks have been entered using this
format, type **<return>** again, to continue formatting:

```
File system blocksize? [512-8192]:                      1024
Default boot name?:                               is(0,0)sys3
```

This step causes a delay of 5-10 min, depending upon disk size.
During this time, the system is formatting the disk according to

---

* 5 for 72-megabyte disks; 10 for 145-megabyte disks.

the user specifications just provided. Upon completion, the
system console displays:

    Disk formatted and initialized successfully!
    Exit 0

    Boot --
    :

mkfs (Make a File System)

This standalone program constructs a file system according to
user-specified parameters. The program prompts for all
parameters, including file system size, device, offset and file
length.

For example, to make a file system that is 20000 blocks long
(1024-byte blocks), on disk unit 0, at offset 0, respond to the
boot program as follows (user response is in **bold**):

```
Boot --
: mkfs

Standalone mkfs --
File system size: 20000
File system: is(0,0)
isize = 12800
m/n = 3 500
Exit 0

Boot --
:
```

Note that the mkfs on the Sys3 UNIX release tape was used. If
the Sys3 UNIX file system is intact, it would also be possible to
use the standalone mkfs from the disk; this could be done by
typing:

is(0,0)stand/mkfs

in response to the boot prompt.

restor (Restore a File System from Dump Tape)

(NOTE: Before attempting to use the standalone restor program,
the standalone mkfs program must be run.)

To restore a file system from dump tape, after making a file
system, make sure the release tape is loaded and type **restor** in
response to the boot prompt. Wait for restor prompts and then
remove the release tape and load the dump tape before responding
to the restor prompts. The restor standalone program will then
prompt for the name of the dump tape and the disk location of the
file system.

For example, to restore the Sys3 UNIX file system from a tape on
tape unit 0 (at offset 20) to disk unit 0 (at offset 0), respond
as indicated in **bold**:

        Boot --
        : **restor**

After typing **restor**, wait for restor prompts; remove release tape
and load dump tape before responding to the restor prompts.

        Standalone restor --
        Tape? **rm(0,20)**
        Disk? **is(0,0)**
        Last chance before scribbling on disk. **<return>**
        End of Tape
        Exit 0

        Boot --
        :

icheck (File System Consistency Check)

This standalone program prompts for the pathname of a file system
on disk and verifies file system integrity by doing a consistency
check, reporting any inconsistencies it finds. A typical check
of a file system on disk unit 0 starting at offset 0, assuming a
release tape in tape unit 0, might look as follows (with user
response indicated in **bold**):

```
    Boot --
    : icheck

    Standalone icheck --
    File: is(0,0)
    is(0,0):
    files 2507  (r=2309,d=140,b=17,c=37)
    used 26500  (i=577,ii=36,iii=0,d=25855)
    free 11932
    missing 0
    Exit 0

    Boot --
    :
```

In this example:

    "files" indicates the number of files in the file system,
    "used" indicates the number of blocks of data used,
    "free" indicates the number of remaining blocks and
    "missing" indicates number of inconsistencies identified.

dd (Copy a File from Device to Device)

This program is modeled after DD(1), but performs only a subset of the DD(1) functions. The available parameters are printed as prompts and should be answered accordingly. It is possible to copy a file system out of a file system onto a fixed location on the disk or tape, but copying into a file system is not permitted.

For example, to copy a file system named /testfile that is 20 blocks long (512-byte blocks) from a file system on disk drive 0 starting at offset 40000 to a tape in tape drive 0 at offset 0, respond to the boot prompt as indicated in **bold**:

```
    Boot --
    : dd

    Standalone dd --
     if: is(0,40000)/testfile
     of: rm(0,0)
     count: 20
     bs: 512
     skip: 0
     seek: 0
    20 blocks copied successfully!
    Exit 0

    Boot --
    :
```

fbackup (Fast Disk/Tape Backup and Restor)

This program copies from disk to tape or from tape to disk while
using the tape in streaming mode. It blocks files at 32 blocks
per record.

For example, to copy a file system that is 20000 blocks long
(512-byte blocks), starting at offset 40000 on disk drive 1, onto
the tape in tape unit 0, respond to the boot prompt as indicated
in **bold**:

    Boot --
    : **is(0,0)stand/fbackup**

NOTE: The pathname "is(0,0)/stand/fbackup" indicates the location
of the fbackup program (disk 0). This program will then prompt
for the location of the file system (in this example, disk 1).

    Standalone fbackup --
    Backup to tape or Restore from tape? [br]: **b**
    Disk unit? [0-3]: **is(0,0)**
    Tape unit? [0-3]: **0**
    Starting disk block number for backup/restore? [0,111719]: **40000**
    Number of blocks in backup/restore? [1,67720]: **20000**
    Disk reads complete!
    Backup to tape completed successfully
    Exit 0

    Boot --
    :

This tape can be restored using the fbackup program or by using
the Sys3 UNIX command DD(1) with **bs=32b.**

od (Octal Dump)

This program is modeled after OD(1), but works as a standalone
program from the tape. It dumps a file to the screen in octal or
hex format, according to the arguments provided by the user.

For example, to see a hex dump of a file on disk 0, at offset 0,
and named "xx/yy", respond to the boot prompt as indicated in
bold:

```
    Boot--
    : od

    Standalone od --
     arg[1]: -x
     arg[2]: is(0,0)xx/yy
     arg[3]:
```

To the last prompt, respond with a <cr> (null argument). The
program will begin dumping the file to the screen according to
the arguments provided and as described in OD(1). When the file
has been completely dumped to the screen, a boot prompt will be
issued:

```
    Boot --
    :
```

dconfig (Disk and System Configuration)

CAUTION:

This program should only be used by someone familiar with
the layout of the file systems on disk. Incorrect usage
could destroy both files and file systems and cause the
operating system to be unbootable.

This program configures a disk with initialization information
and the logical file system layout for Sys3 UNIX.

Use dconfig to change the logical layout of the Sys3 UNIX file
systems on disk. It prompts for all needed information, giving
the current value in brackets[]. A <cr> leaves the values the
same; a <cr> to a yes-or-no question defaults to no.

In the example below, the given responses are the default values
for Sys3 UNIX. A tilde (~) given for sector count represents a
value that would map the dkX's address space to the end of the
disk.

To use dconfig, first ensure that a Plexus Sys3 UNIX release tape
is properly installed in the tape drive. The console will prompt
as follows (respond as indicated in **bold**):

```
    : dconfig

    Standalone dconfig --
    Disk? :                                         is(0,0)
    Disk id? [is]:                                  is
    Primary bootname? [is(0,0)sys3]                 is(0,0)sys3
    Secondary bootname? []:                         <cr>
    Number of cylinders? [0]:                       823
    Number of heads on removable? [0]:              0
    Number of heads on fixed? [0]:                  5 or 10*
    Data bytes per sector? [0]:                     512
    Sectors per track? [0]:                         35
    Number of alternate cylinders? [0]:             20
    File system blocksize? [0]:                     1024
    Change the default unix device mapping? [y/n]:y
    Rootdev? [0x0]:                                 0x1
    Pipedev? [0x0]:                                 0x1
```

---

  * 5 for 72-megabyte disks; 10 for 145-megabyte disks.

```
Dumpdev? [0x0]:                                     0x1
Swapdev? [0x0]:                                     0x1
Swplo? [0]:                                         36000
Nswap? [0]:                                         4000
Change the file system disk configuration? [y/n]:y
File system logical configuration? [sector start,sector count]
        dk0    [    0,    0   ]:       0,~
        dk1    [    0,    0   ]:       0,40000
        dk2    [    0,    0   ]:       40000,~
        dk3    [    0,    0   ]:       60000,~
        dk4    [    0,    0   ]:       80000,~
        dk5    [    0,    0   ]:       100000,~
        dk6    [    0,    0   ]:       120000,~
        dk7    [    0,    0   ]:       140000,~
        dk8    [    0,    0   ]:       160000,~
        dk9    [    0,    0   ]:       180000,~
        dk10   [    0,    0   ]:       200000,~
        dk11   [    0,    0   ]:       220000,~
        dk12   [    0,    0   ]:       240000,~
        dk13   [    0,    0   ]:       260000,~
        dk14   [    0,    0   ]:       280000,~
        dk15   [    0,    0   ]:       300000,~
Is the above information correct? [y/n]:       y
Are you sure you want to rewrite block 0?:     y
Block 0 of is(0,0) initialized successfully!
Exit 0

Boot --
:
```

To execute the disk copy of the standalone dconfig program, type:

is(0,0)stand/dconfig

in response to the boot prompt.

FIGURE CAPTIONS

(1)   Plexus P/40 System (Front View)

(2)   Plexus P/40 System (Rear View, Exterior)

(3)   Plexus P/40 System (Rear View, Interior)

(4)   System Controls

(5)   Tape Drive Controls

(6)   Processor Controls

(7)   Unpacking the Plexus P/40

(8)   Tape Threading Path and Related Parts

(9)   Tape Drive Maintenance-Access Position

(10) Processor Module (Rear View)

(11) Disk Drive (Rear View)

(12) Disk Motor Lock

(13) Disk Spindle Lock

(14) Disk Actuator Lock

(15) Disk Drive Power Supply (Rear View without Cables)

(16) Tape Drive Service-Access Position

(17) Tape Drive Filter and Fuse (Top View, Cover Open)

(18) Tape Drive Cabling

(19) Processor Module Power Supplies and Battery

(20) Processor Battery and Test Points

(21) Processor Board Option Selectors

(22) ICP Board Option Selectors
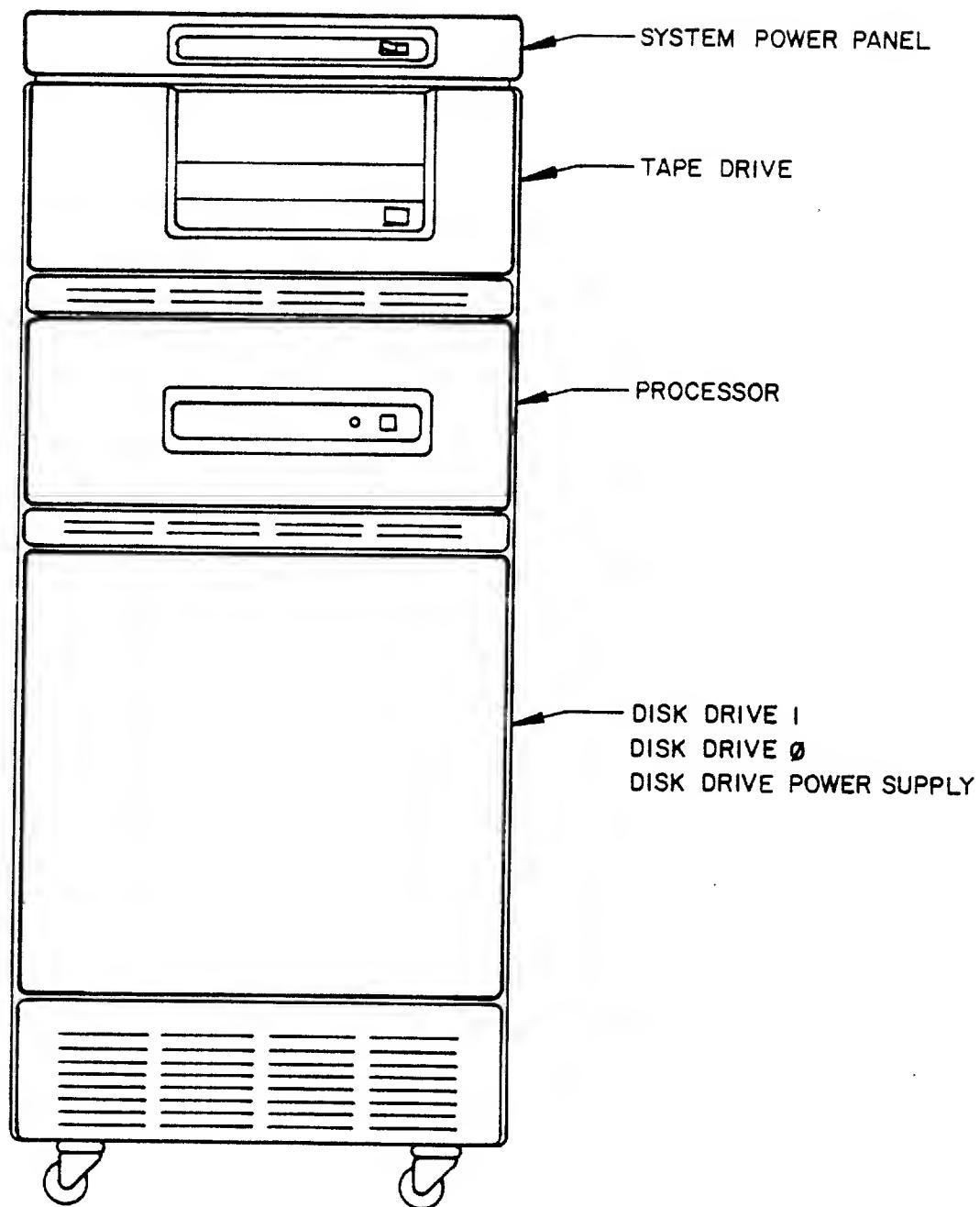
Figure 1.   Plexus P/40 System (Front View)

COOLING FANS

REAR-ACCESS PANEL

SYSTEM MASTER
CIRCUIT BREAKER

SYSTEM POWER CORD
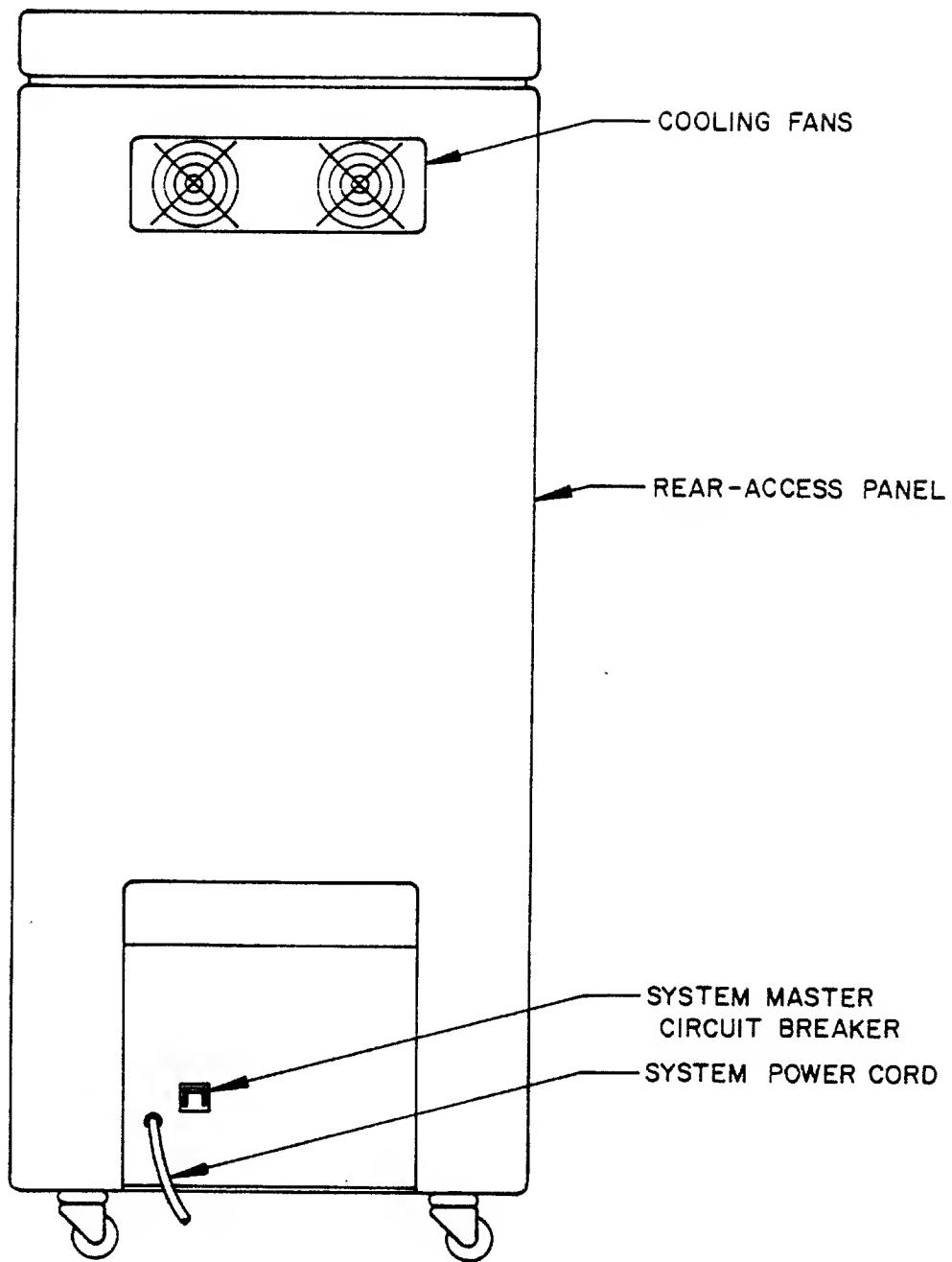
Figure 2.   Plexus P/40 System (Rear View, Exterior)

3

TAPE DRIVE

PROCESSOR

DISK DRIVE 1

DISK DRIVE 0

DISK DRIVE
POWER SUPPLY
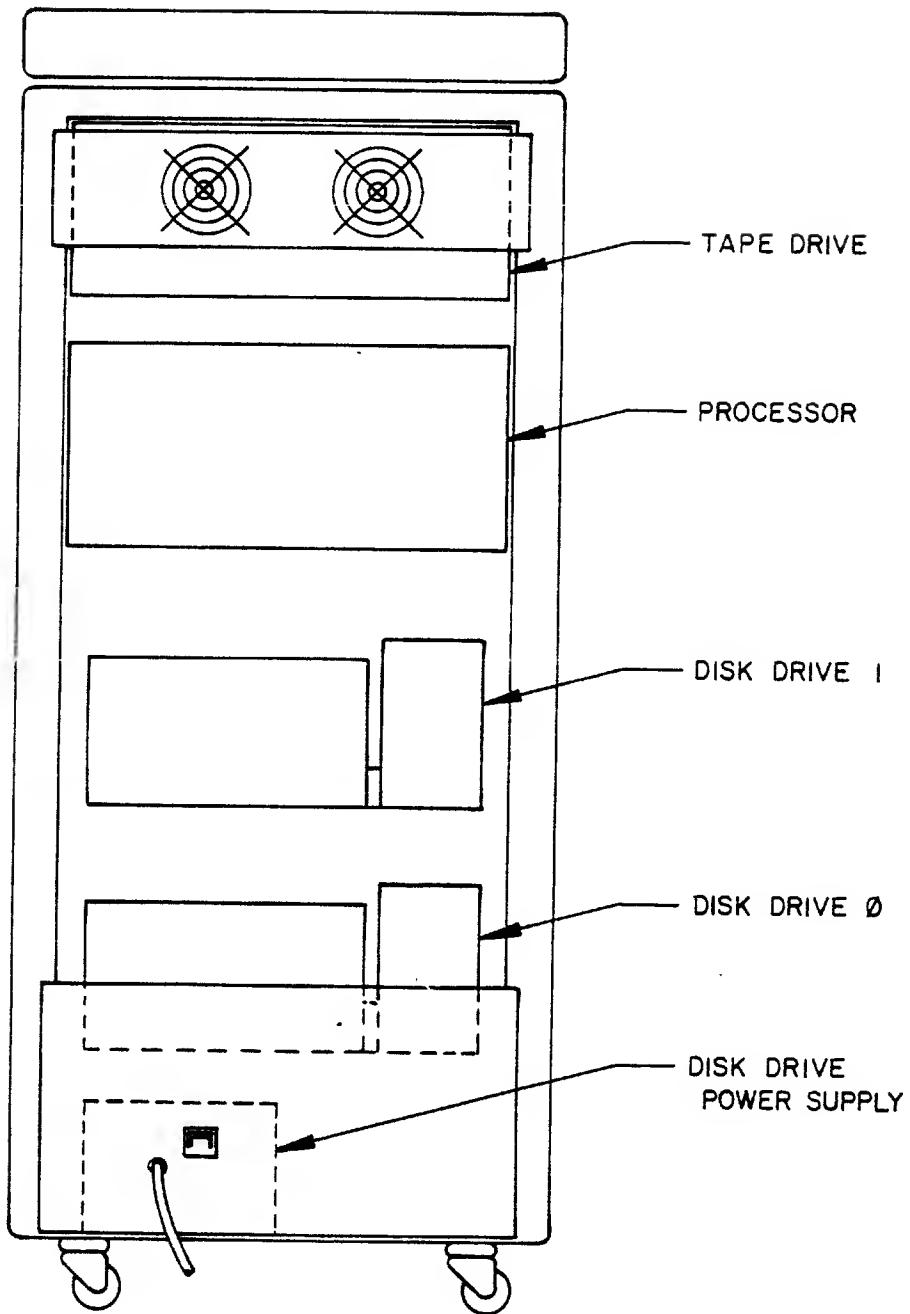
Figure 3.   Plexus P/40 System (Rear View, Interior)

SYSTEM POWER ON/OFF SWITCH

SYSTEM POWER INDICATOR
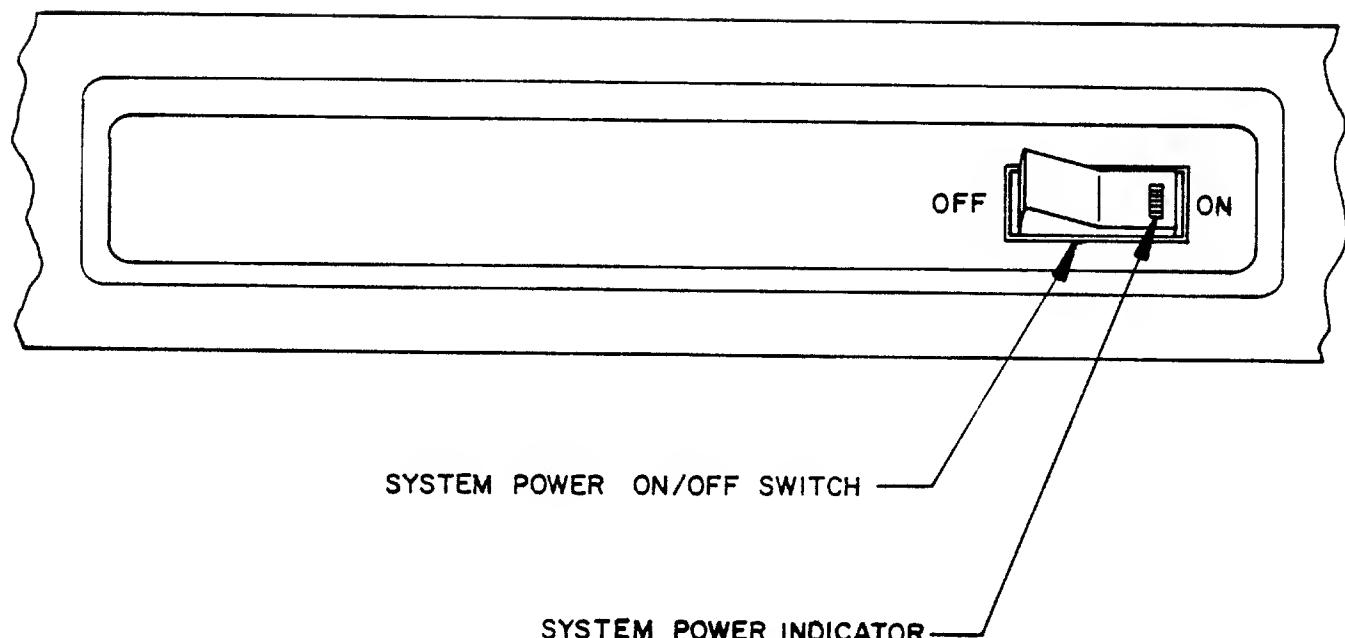
Figure 4.   System Controls

LOAD/REWIND ———

UNLOAD ———

ON-LINE ———

WRT EN/TEST ———

HI DEN ———

POWER ———
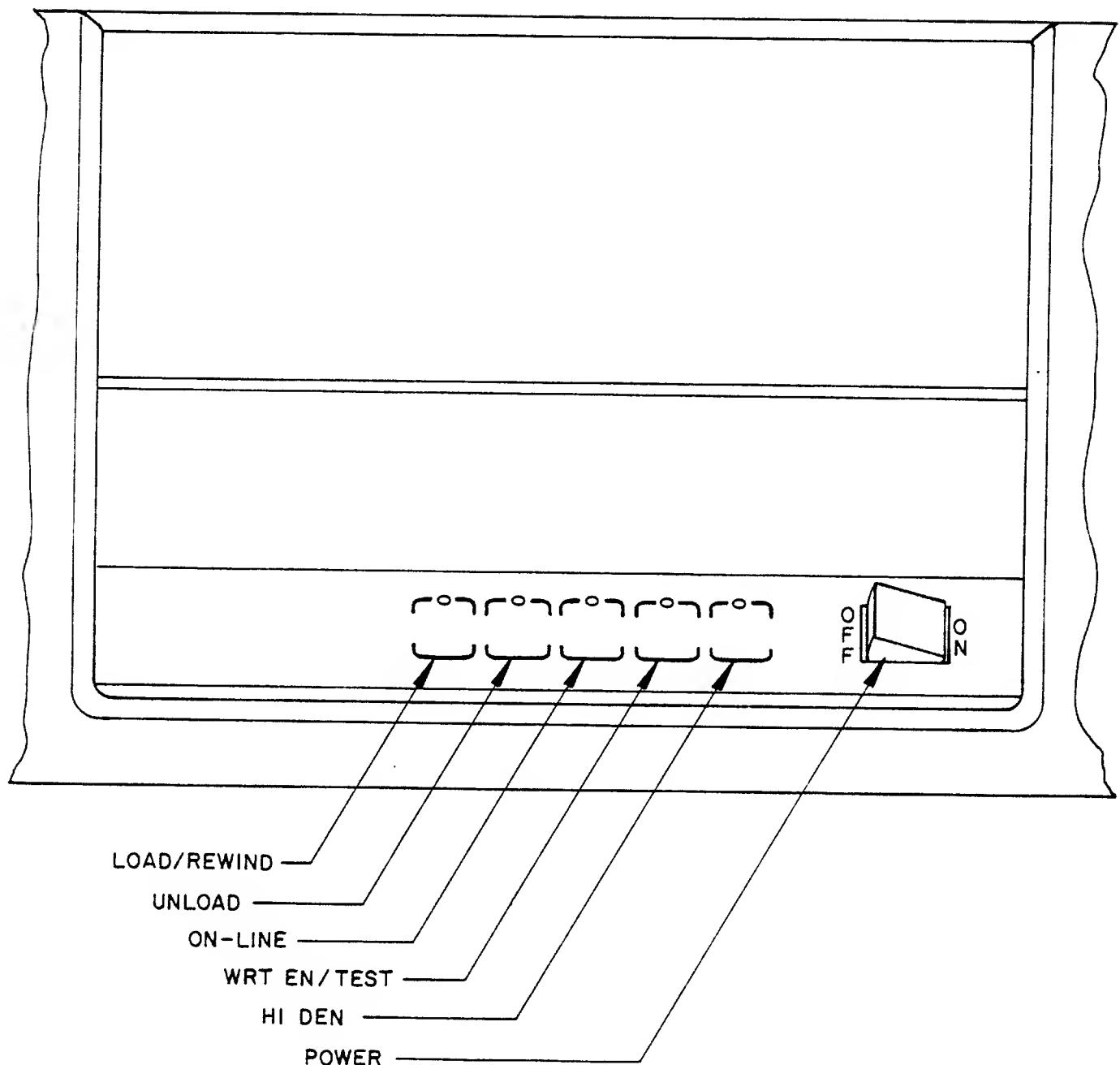
Figure 5.   Tape Drive Controls

POWER INDICATOR
RESET BUTTON
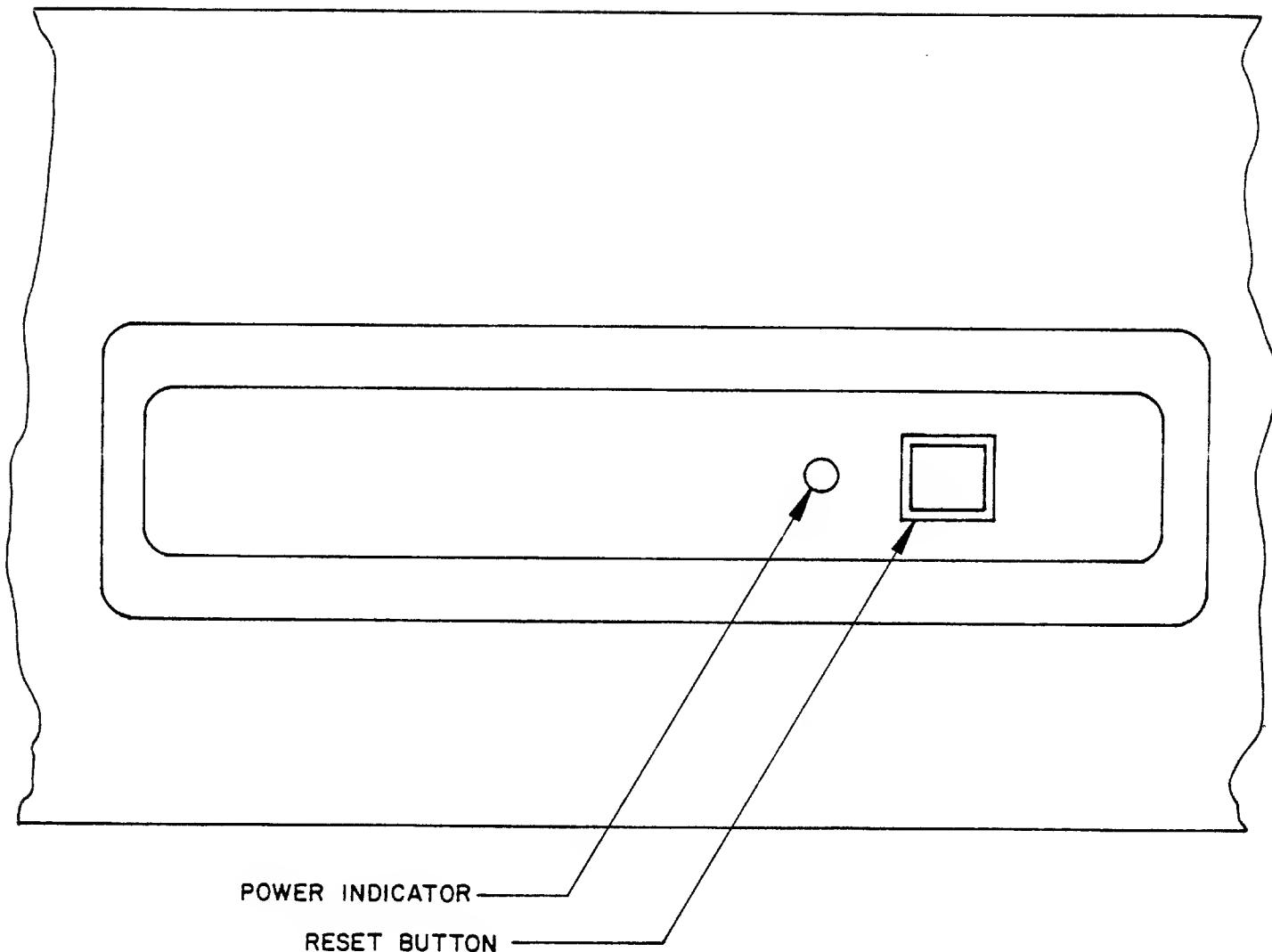
Figure 6. Processor Controls

(1) CARTON CAP
(LIFT OFF)

(2) CLIMPS
(REMOVE)

(3) CARTON SIDES
(LIFT OFF)
RAMP
(LET DOWN)

(4) FOAM CORNER PADS
(LIFT OFF)

(5) FOAM WAIST PADS
(LIFT OFF)

(6) FOAM BASE PADS (REMOVE)

(7) RAMP FILLER BOARDS
(INSERT IN GAPS)
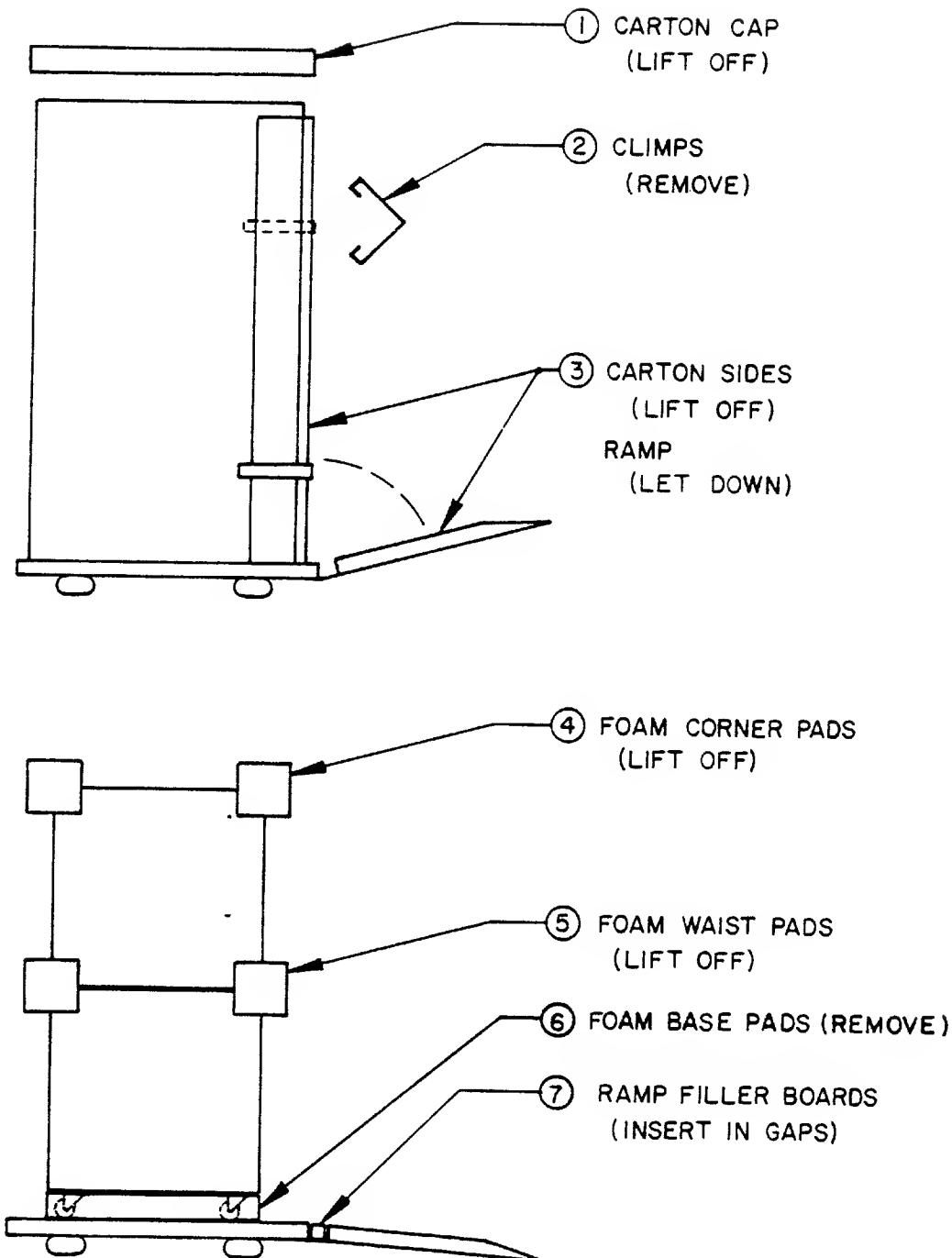
Figure 7.   Unpacking the Plexus P/40

TAKEUP HUB

TACHOMETER

HEAD

TAPE CLEANER

TAPE ROLLER GUIDE

COMPLIANCE ARM
ROLLER GUIDE

ROLLER GUIDE

REEL HUB PAD

SUPPLY
REEL
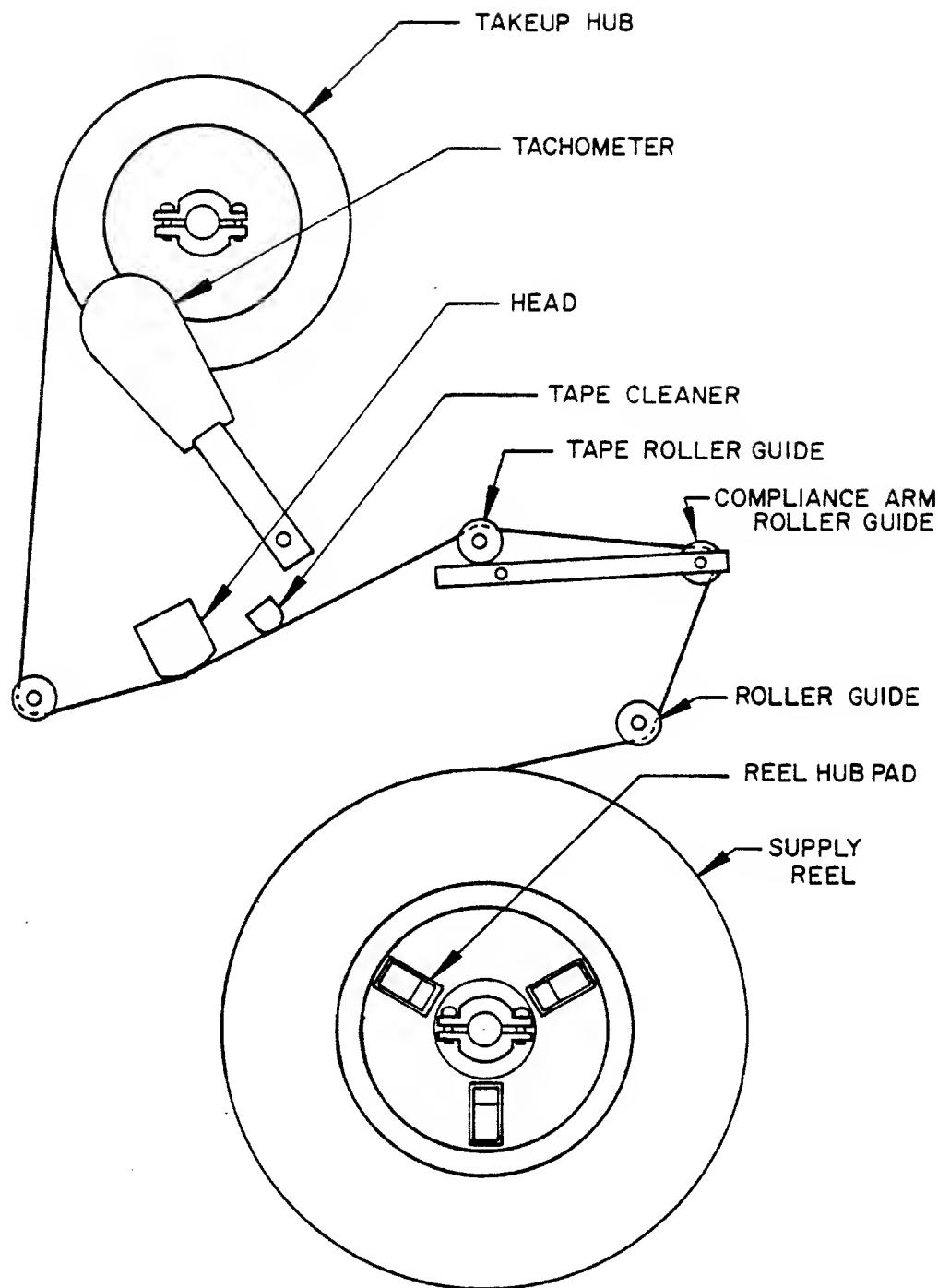
Figure 8.   Tape Threading Path and Related Parts

FRONT
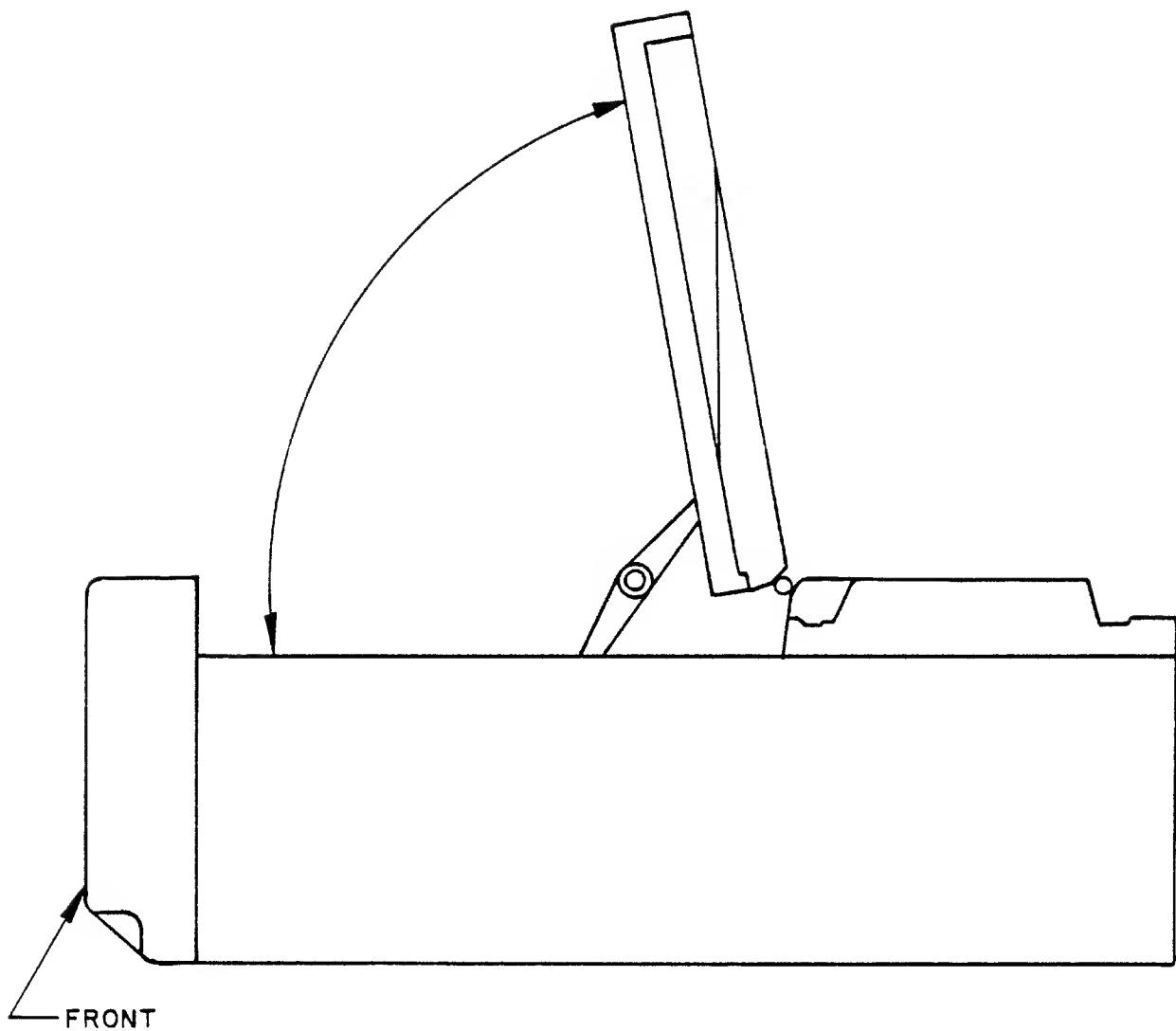
Figure 9.   Tape Drive Maintenance-Access Position

I/O PORT CONNECTOR
PANEL 1
(SER 0-7)
(PAR 0)

I/O PORT CONNECTOR
PANEL 3
(SER 16-23)
(PAR 2)

I/O PORT CONNECTOR
PANEL 2
(SER 8-15)
(PAR 1)

POWER CORD RECEPTACLE
(TO POWER DISTRIBUTION UNIT)

FUSE

CONSOLE
(DIAGNOSTIC)

POWER SWITCH (ON)
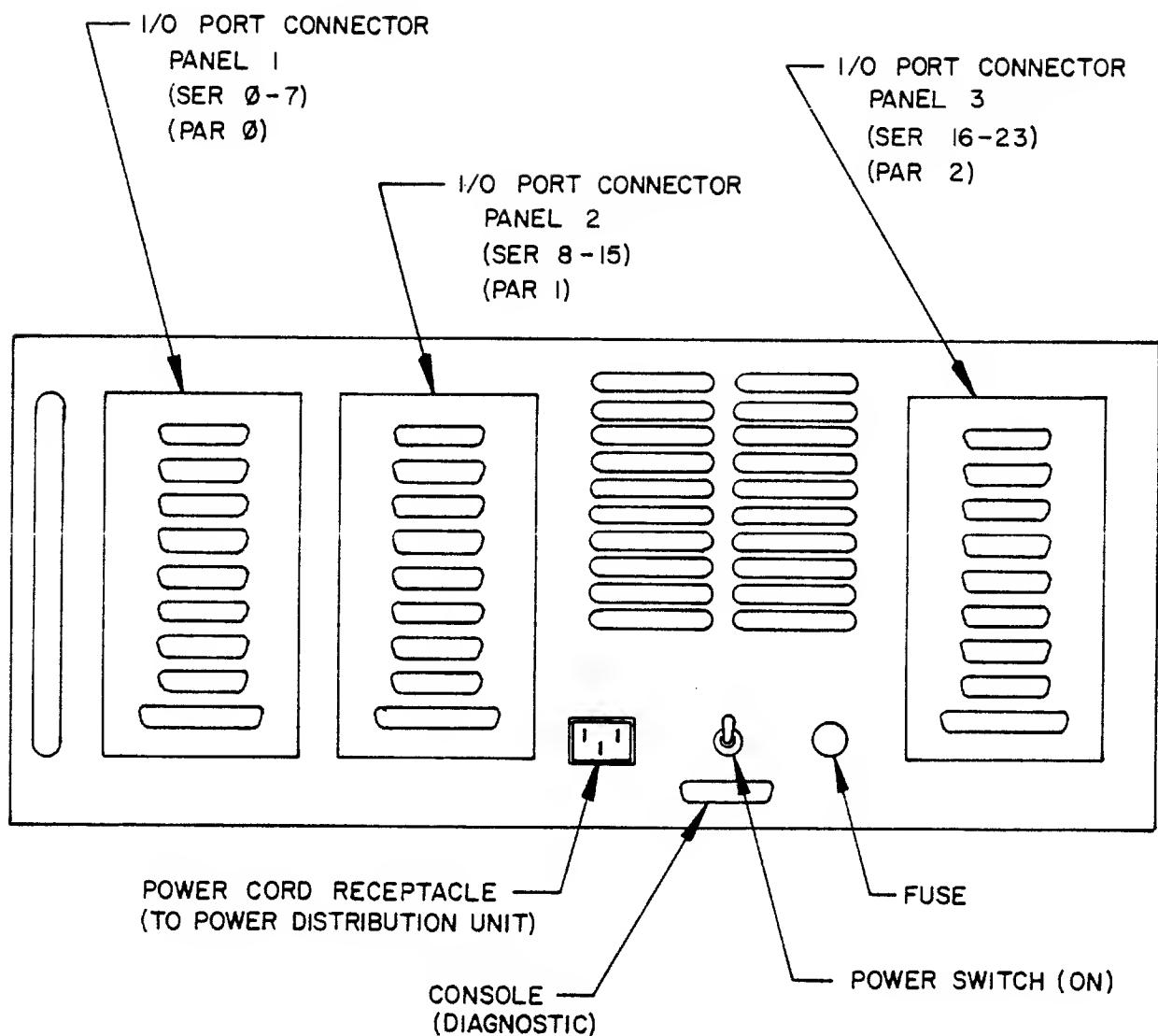
Figure 10.   Processor Module (Rear View)

PROCESSOR CABLE A
(DAISY-CHAINED FROM DISK CONTROLLER)

PROCESSOR CABLE B
(RADIAL FROM DISK CONTROLLER)

POWER CABLE B
(FROM POWER SUPPLY)

GROUNDING WIRE OF
LINE TERMINATOR

TERMINATOR
(LAST DRIVE ONLY)

POWER CABLE A
(FROM POWER SUPPLY)
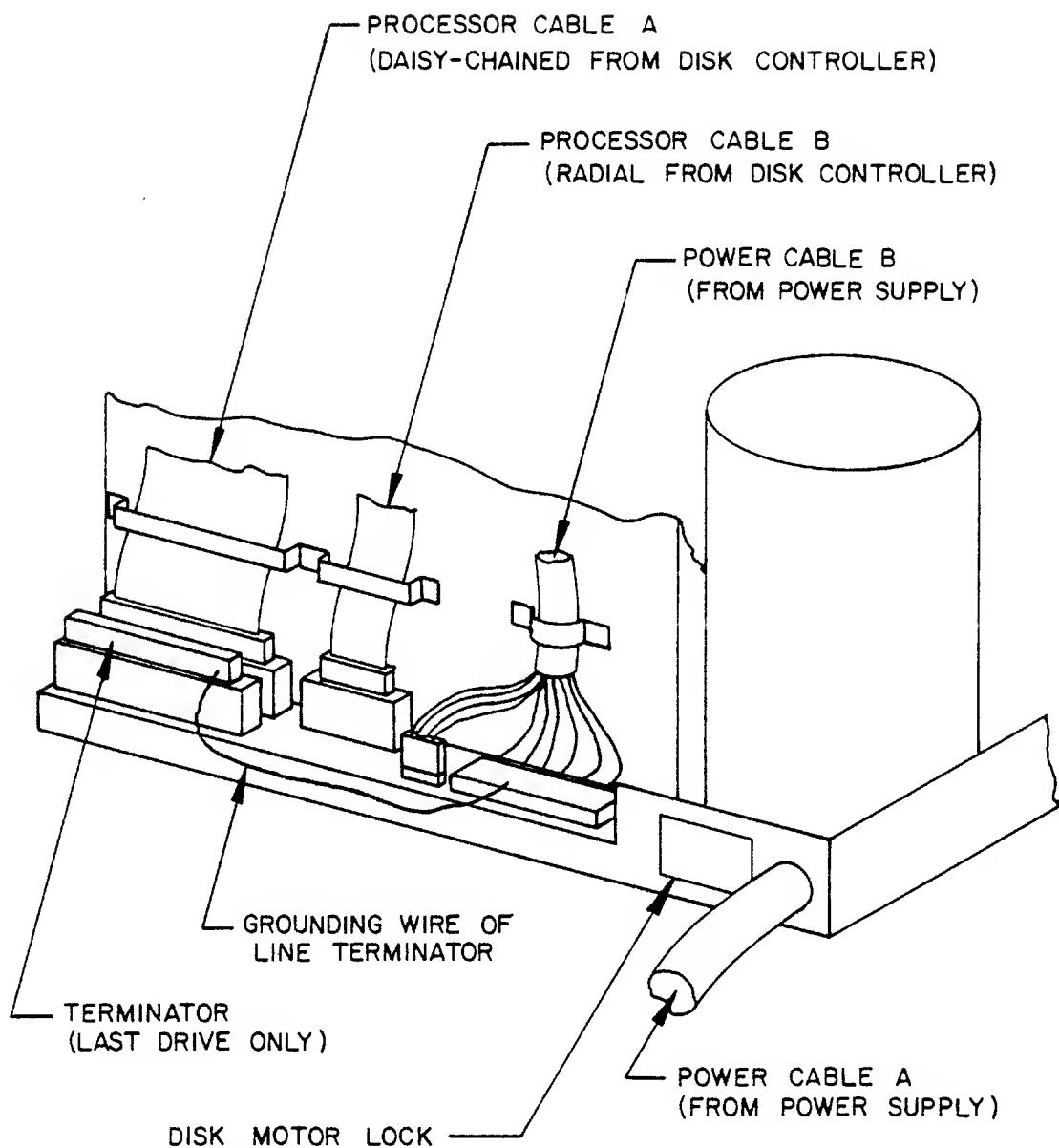
DISK MOTOR LOCK

Figure 11.   Disk Drive (Rear View)

(a) MOTOR LOCKED

SCREWS A

(b)MOTOR UNLOCKED

SCREWS A
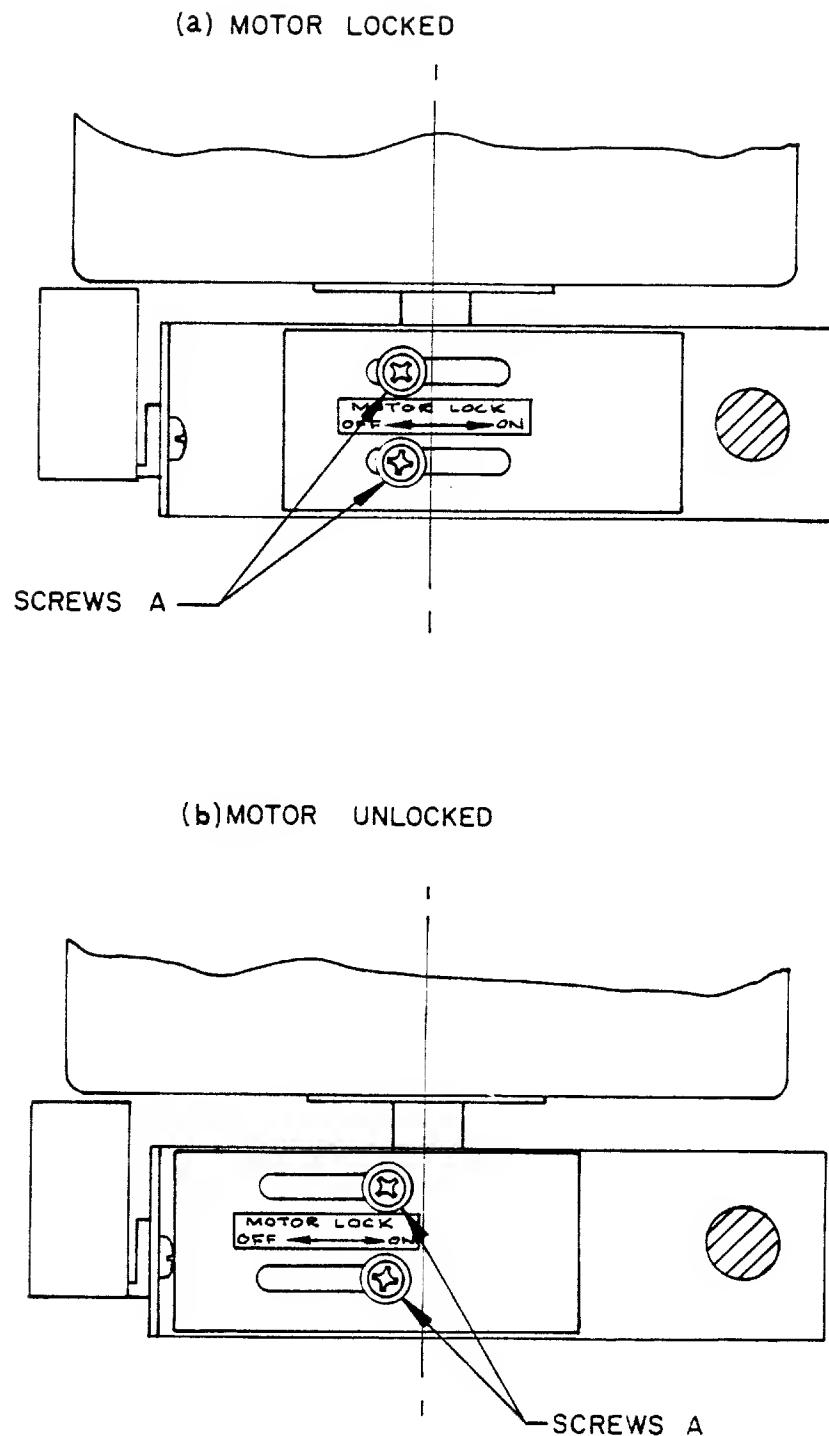
Figure 12. Disk Motor Lock

(a) SPINDLE LOCKED
(bottom view)

SPINDLE GROUNDING PLATE

(b) SPINDLE UNLOCKED
(bottom view)

(c) SPINDLE UNLOCKED
(side view)

SPINDLE GROUNDING PLATE

SPINDLE GROUNDING·CONTACT
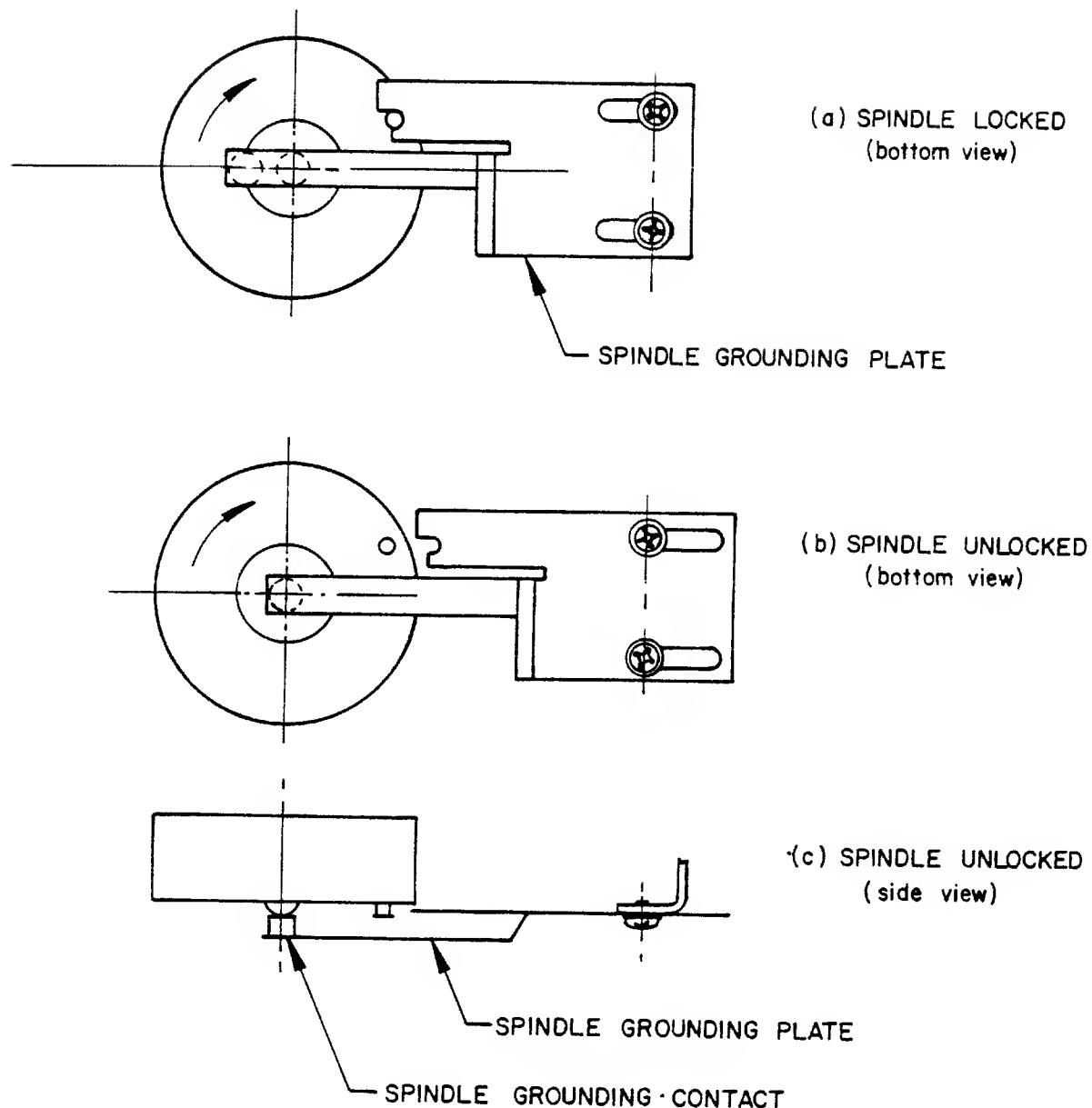
Figure 13.   Disk Spindle Lock

KNOB

(a) ACTUATOR LOCKED   (b) ACTUATOR UNLOCKED
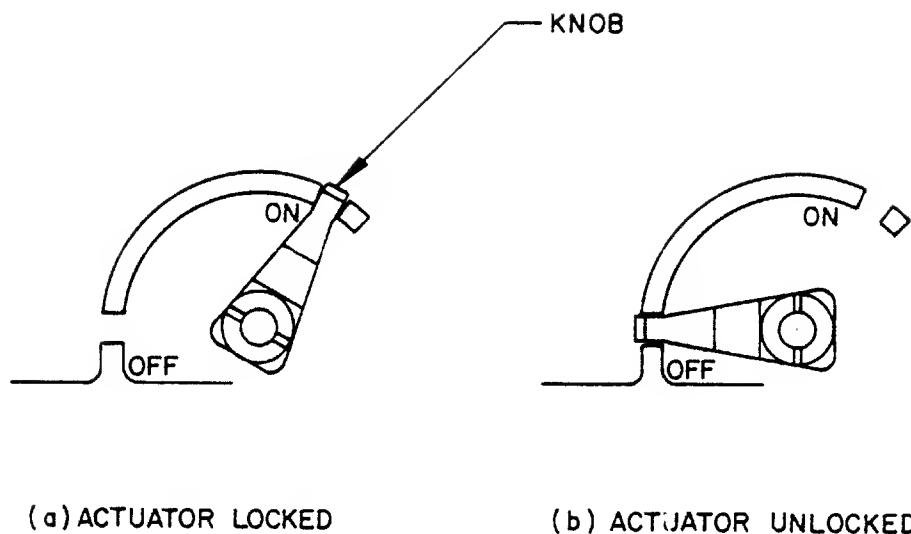
Figure 14.   Disk Actuator Lock

POWER CONTROL —————   ——— DC POWER
CONNECTOR   CONNECTOR

FUSE 2 ————   ——— REMOTE/LOCAL

FUSE 1 ————

ON

OFF

AC POWER
CONNECTOR

MAIN LINE SWITCH   FUSE 3 ————
                                       (50 Hz systems only)
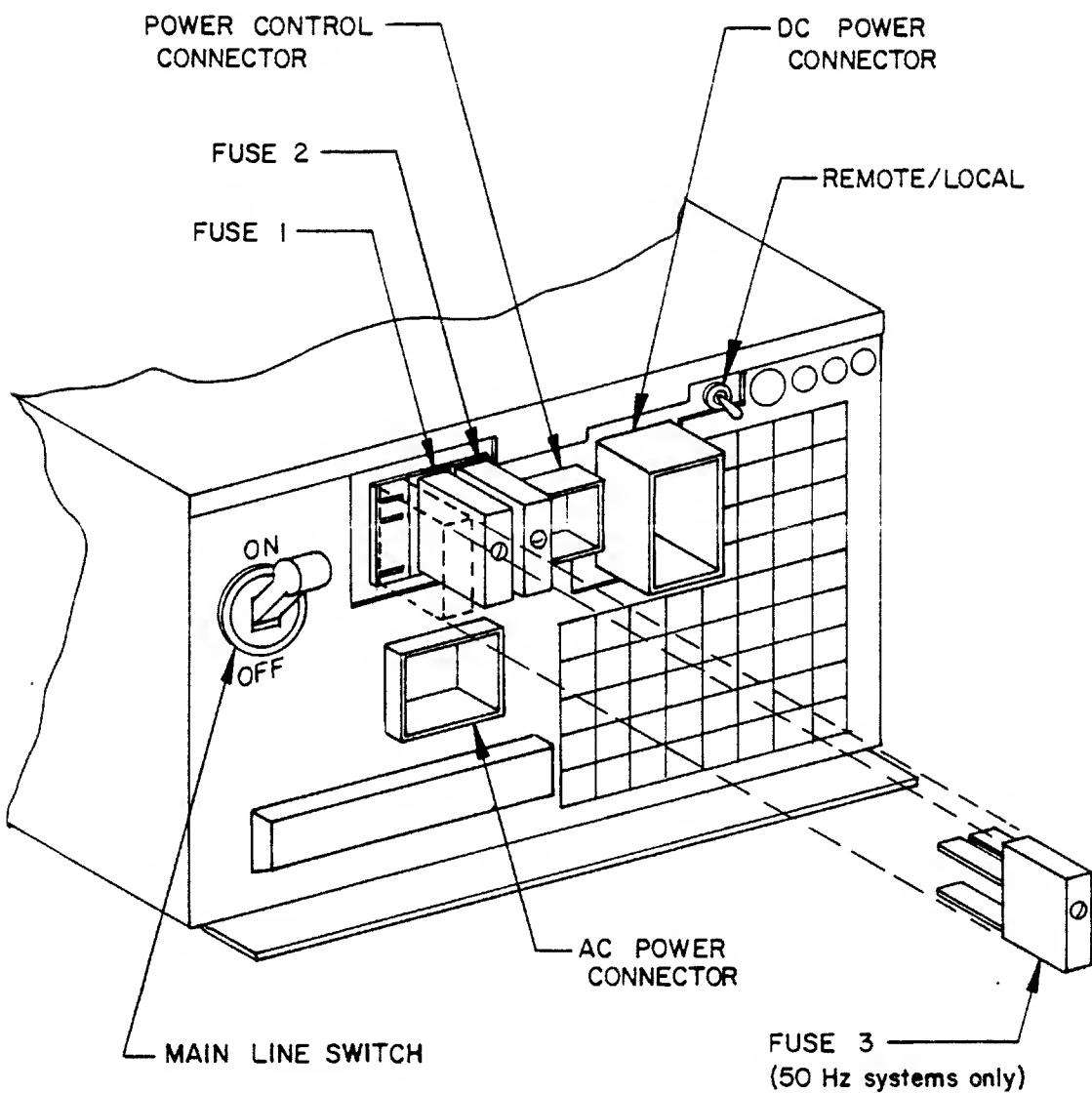
**Figure 15. Disk Drive Power Supply (Rear View without Cables)**
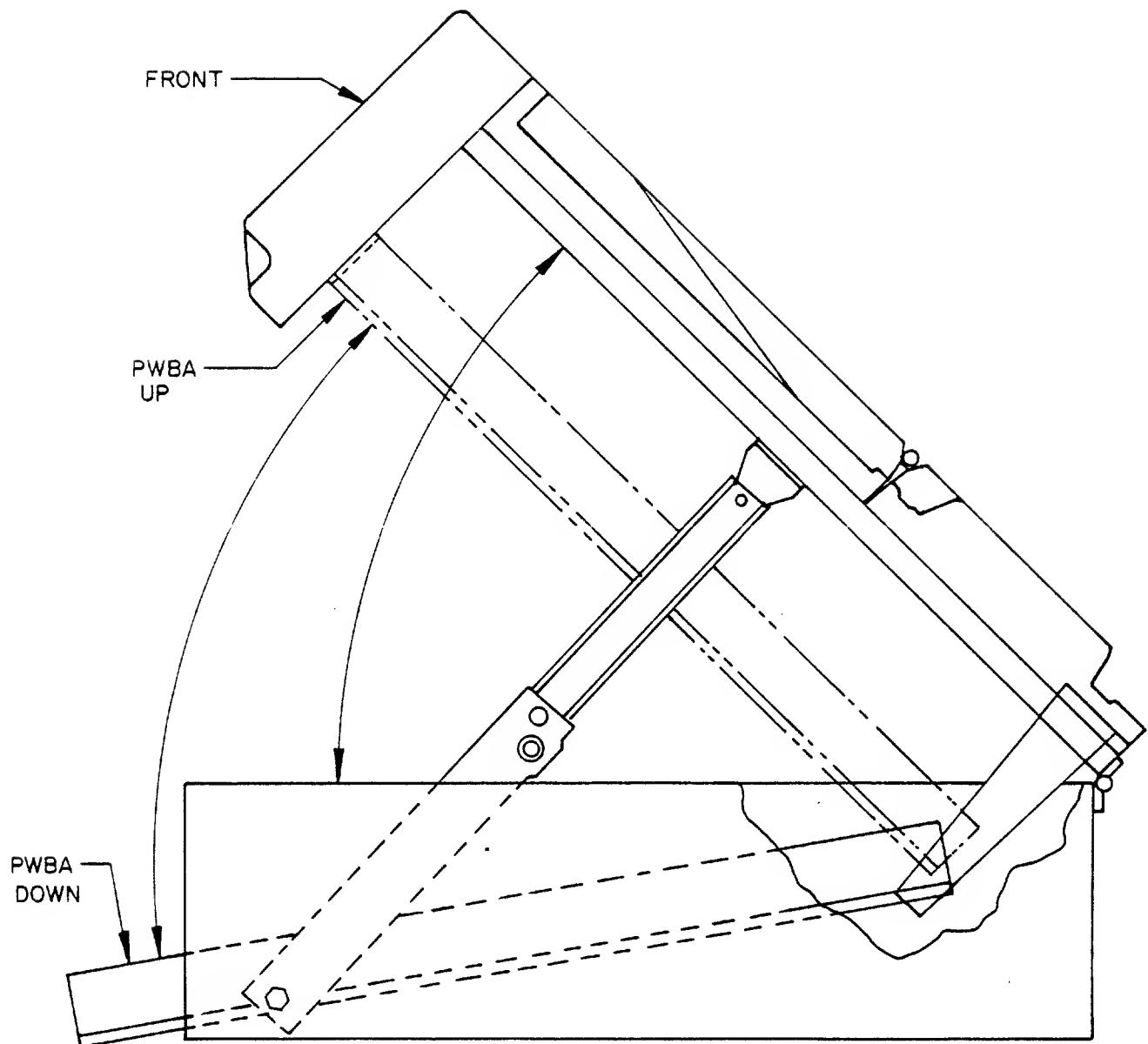
Figure 16.   Tape Drive Service-Access Position
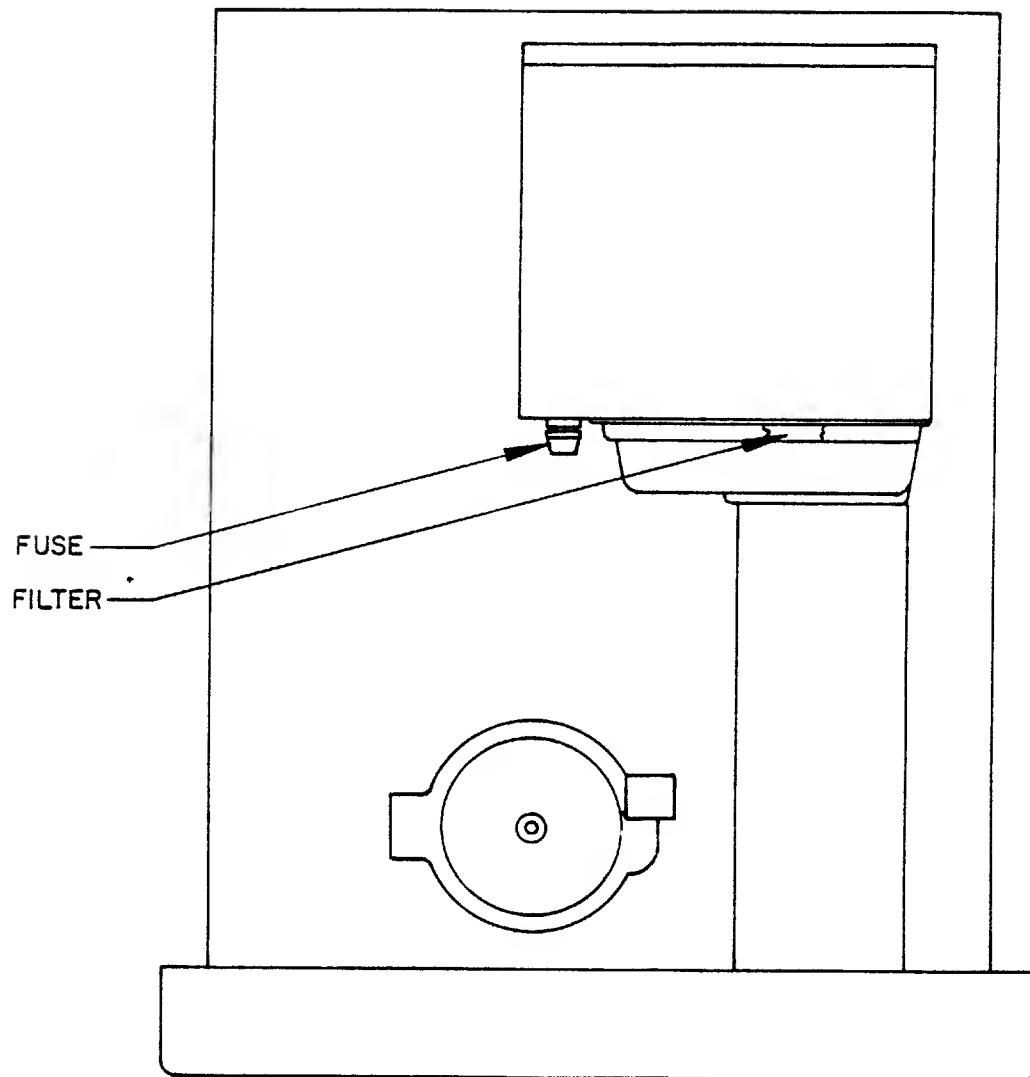
FUSE

FILTER

Figure 17.   Tape Drive Filter and Fuse (Top View, Cover Open)
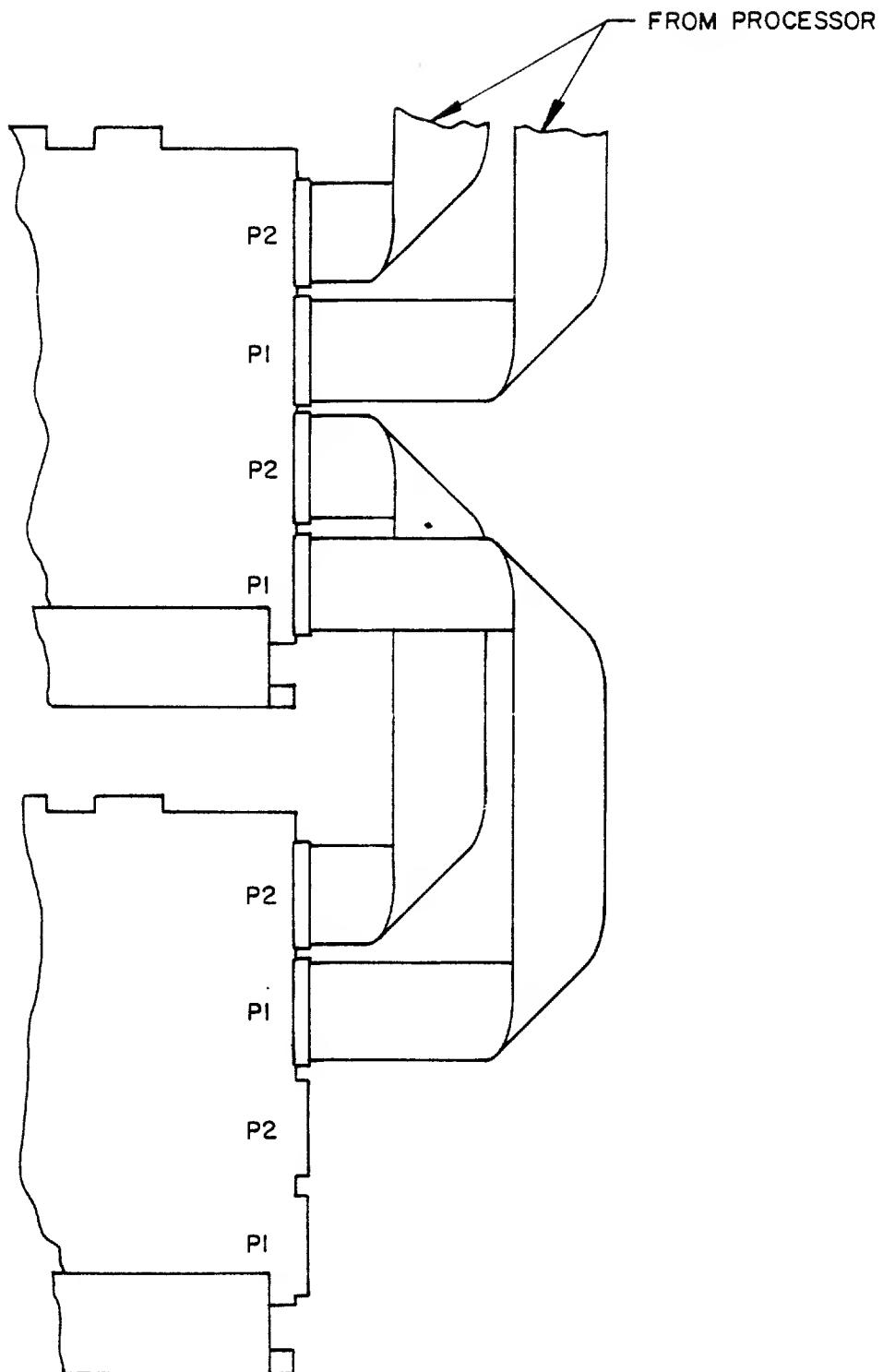
Figure 18. Tape Drive Cabling
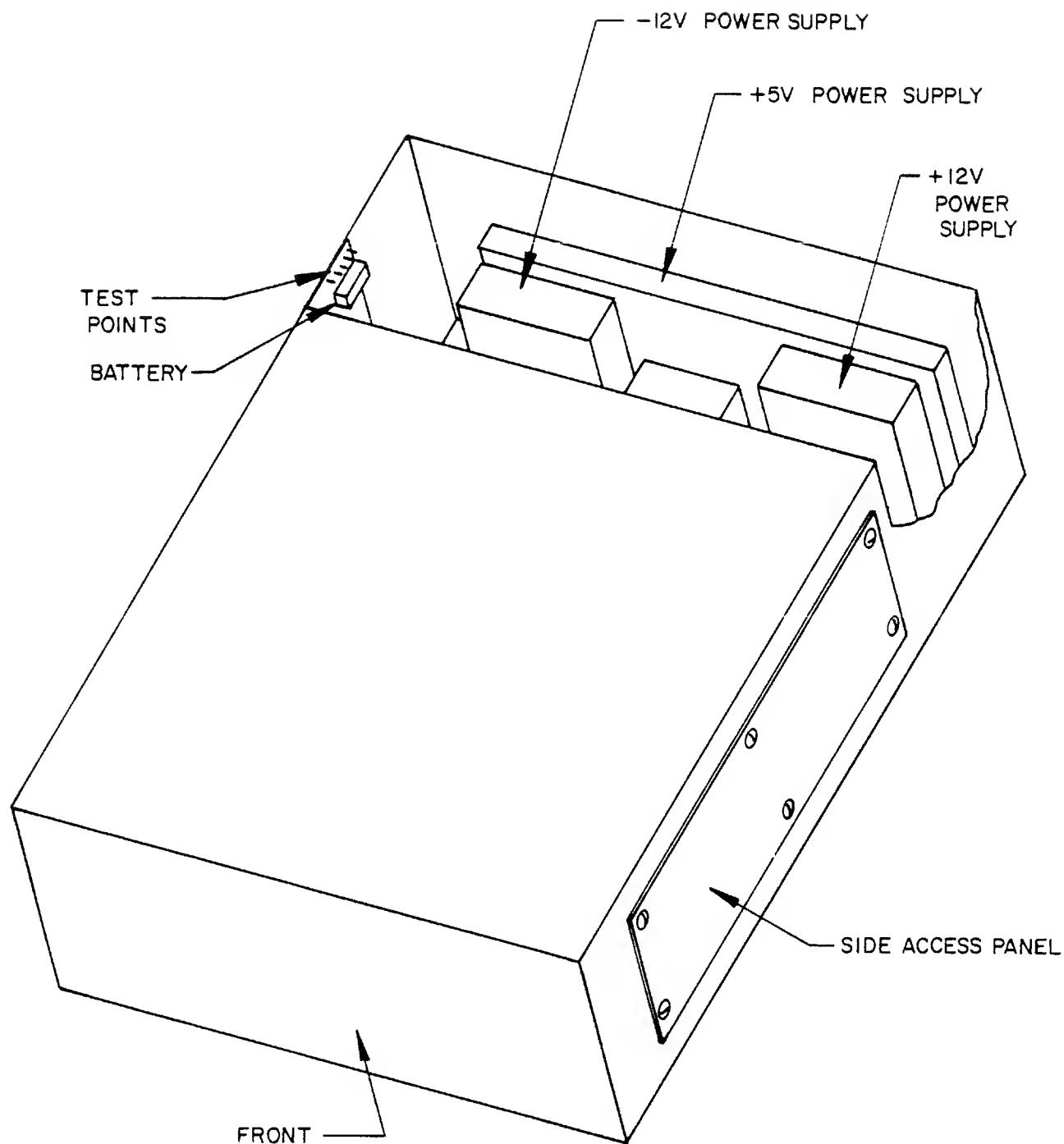
Figure 19. Processor Module Power Supplies and Battery
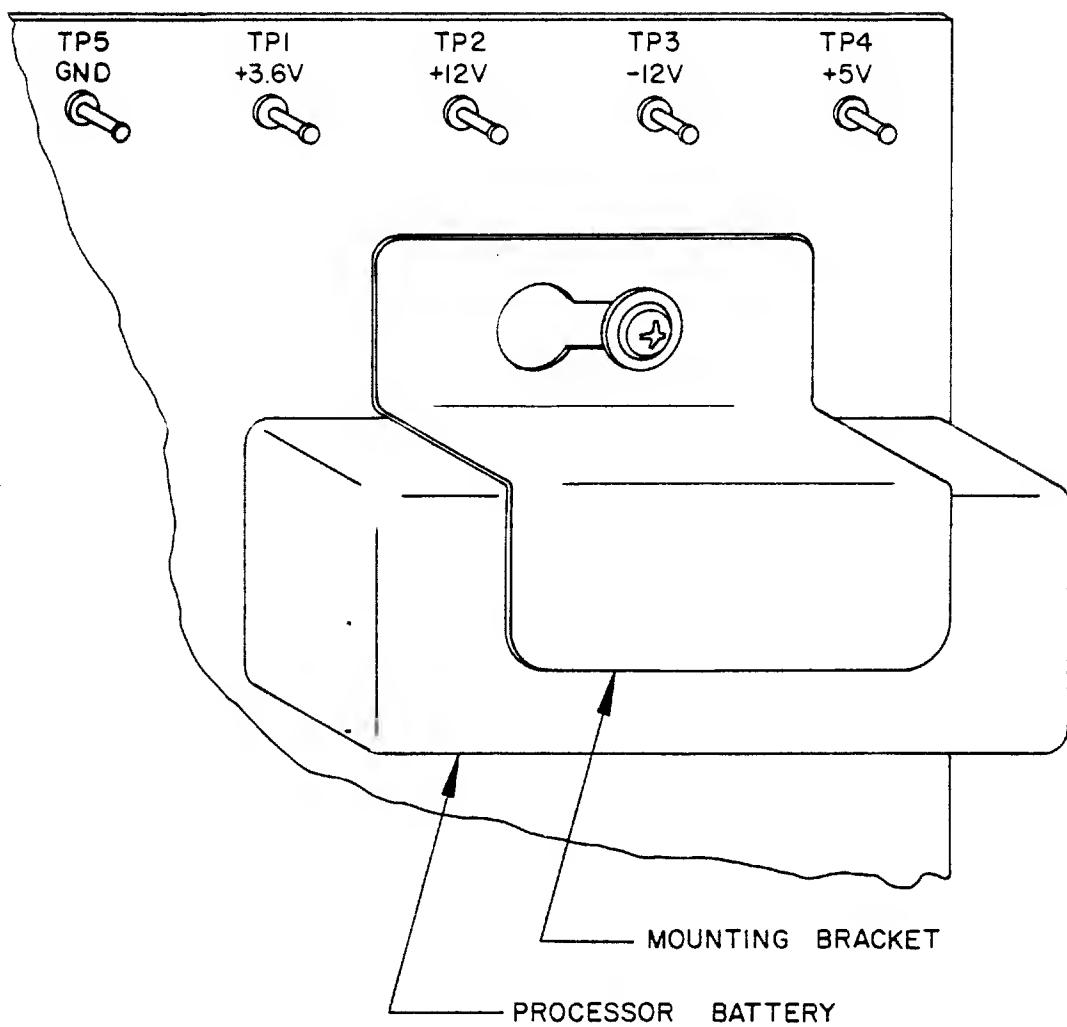
Figure 20. Processor Battery and Test Points
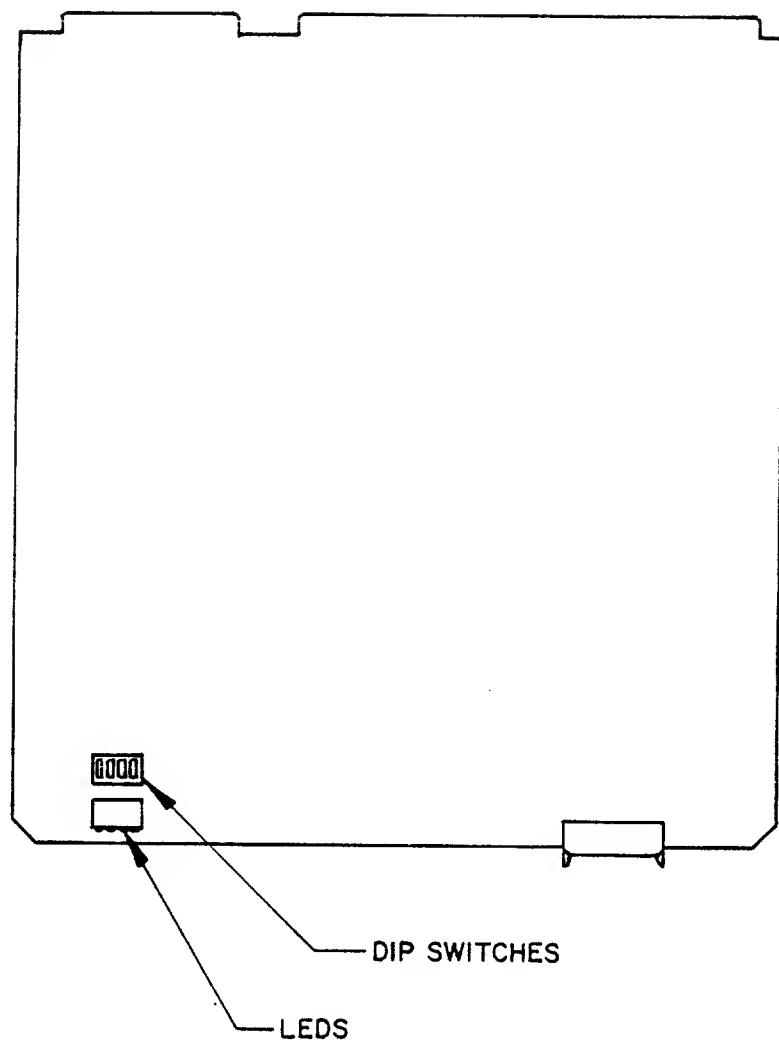
Figure 21. Processor Board Option Selectors
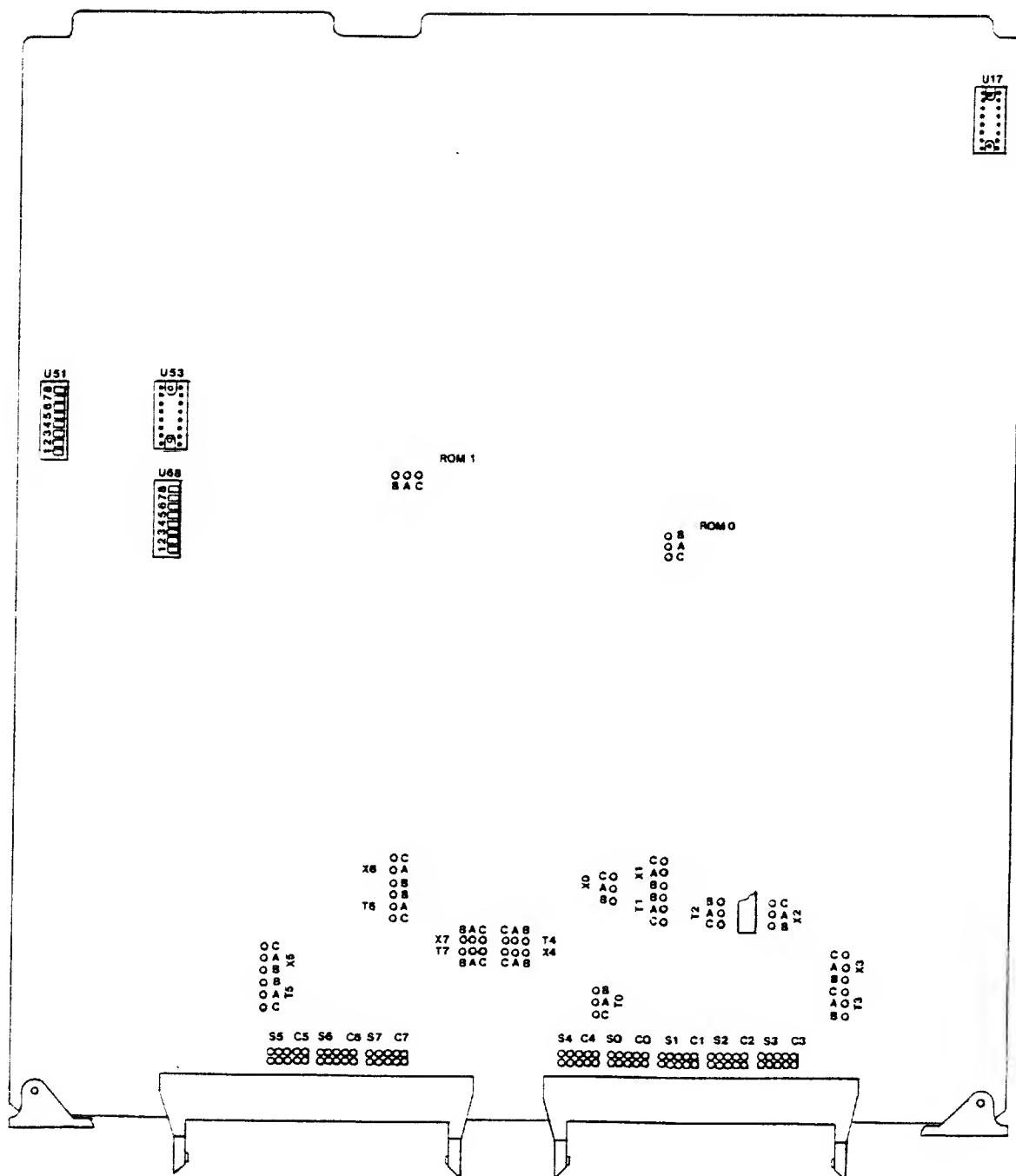
Figure 22.   ICP Board Option Selectors

```
/*------------------------------------------------------*\
|                                                        |
|        PLEXUS COMPUTERS SYS3 ADDENDA REV 1.0           |
|                                                        |
|                 AUGUST 2, 1982                         |
|                                                        |
\*------------------------------------------------------*/
```

INTRODUCTION

The software on this tape is supplied in addition to the standard
Plexus SYS3 release tape. It contains utilities not provided with the
stock System III software. Included is a subset of the 2.0 Berkeley
Software Distribution.

Supplied are 'vi' and the 'csh' plus supporting libraries and manual
pages. Several other software tools have been added from the
distribution tape as well. Also volume 2 chapters have been
incorporated for both 'csh' and 'vi'. The following are supplied:

banner	-	Another version of banner, different format.
csh	-	Berkeley shell ("c" shell).
ctags	-	Creates a "tags" file (for ex(1)).
e	-	A dialect of vi.
edit	-	A dialect of vi.
ex	-	A line oriented dialect of vi.
head	-	Like tail but works with start of file.
ls	-	An enhanced version of ls.
mkstr	-	Creates an error message file from C.
more	-	Paginates output on terminal.
strings	-	Prints out strings within a file.
tset	-	Set terminal modes.
vi	-	Screen editor.
view	-	Another dialect of vi.
xstr	-	Extract strings from C programs for sharing.
printenv	-	Prints environment of shell (same as Sys3 env).
openup	-	Keeps selected files open.
copytape	-	Utility to duplicate magnetic tapes.

All software has been modified to run under Sys3; these tools will
probably NOT run properly under Plexus V7.

DISCLAIMER

Plexus takes no responsibility for maintenance or support of these
programs and is not responsible for any failure incurred by their use.
However, if you encounter any problems with this software or documen-
tation, we would appreciate hearing about it. Please contact:

        Marketing Technical Support
        Plexus Computers, Inc.
        2230 Martin Ave.
        Santa Clara, CA   95050
        (408) 988-1755

LOADING THE TAPE

The tape, as delivered from Plexus, is a single file in tar format
on a 9 track tape at 1600 bpi for the P/40 and on a cartridge tape for
the P/25. All programs have absolute path names to facilitate the
installation of the package.

Use the following instructions to load the software:

1. Load the tape.

2. Login as super user.

3. Create the following directories:

        /usr/plx
        /usr/lib/docs/ex
        /usr/lib/docs/csh

    This is not absolutely necessary but it will suppress error
    messages from tar when it tries to create the directory
    (which didn't exist).

4. Mount the tape (cartridge) and execute:

    tar xvfb /dev/rmt0 20

    This will bring in the contents of the tape. See appendix B
    for a list of supplied files. There may be several (many)
    error messages if the target directories were non existent.
    Don't worry, tar will create them.

Four directories are loaded:

/usr/plx   contains the various Berkeley utilities along
                            with some sample files for use with csh and vi.

/usr/plx/man   contain the manual pages for each of the
                            programs. They were loaded as a sub directory
                            under /usr/plx to prevent any accidental
                            overwriting of the stock Sys3 manual pages.

/usr/lib/docs/ex   contain the volume II chapters
/usr/lib/docs/csh   for both vi and csh.

INSTALLING THE VARIOUS TOOLS

1. CSH

Along with csh are include two files: login, cshrc. These are examples
of the .login and .cshrc files that users may use to set the working
environment of the csh. The /etc/passwd entries for the login shell
may be changed to utilize the csh for those desiring it. One note,
be sure to set the environment variable SHELL to /bin/sh as shown
in the login file. This is necessary because some of the Sys3 programs
use this variable for determining which shell to use.

The file /etc/cshprofile is a command file that implements several
startup features: message of the day, you have mail, news, and sets
the time zone (TZ) automatically. The default time zone is Pacific
Standard Time. If you are in a different time zone, then `setenv TZ'
in /etc/cshprofile will have to be modified to reflect this.

2. VI

Vi requires two files: /etc/termcap and /etc/ttytype. The termcap
file was supplied along with the Plexus Sys3 tape. The file ttytype
in /etc/plx is an image of a /etc/ttytype file; you will need to
modify it according to your terminal configuration. The environment
variable 'TERM' must be set to the terminal type for the given tty
port. See the login and cshrc files in /etc/plx for examples on how
to do this. See appendix A for other changes that may be necessary.

3. Manual Pages

The manual pages may be copied or moved into the respective
subdirectories in /usr/man. Care should be taken not to overwrite
any existing Sys3 entries.

4. CSH & VI documents

The volume II chapter for vi may be generated by executing the makefile
in /usr/lib/docs/ex. This has been set up to direct the output to the
line printer. You may want to change this by editing the makefile.
The document for the csh is already in processed form.

APPENDIX A

Csh checks the format of a shell script before executing it. It uses the presence of a shell comment in line 1 (# followed by text) to distinguish a csh script from a Bourne shell script. Several of the stock Sys3 commands are actually shell scripts and some have first line comments. The csh, of course, becomes very confused and aborts.

Check the following files. They are shell command scripts that have been found to need alteration when using the csh. You may alter the files simply by inserting a blank line at the front of the file just before the comment. This will cause the csh to treat the script as a Bourne shell command file.

```
/usr/bin/greek
/usr/bin/man
/usr/bin/mancvt
/usr/bin/mm
/usr/bin/mmt
/usr/bin/mvt
/usr/bin/osdd
/usr/bin/sccsdiff
/usr/bin/spell
/usr/bin/typo
/usr/bin/uupick
```

APPENDIX B

Results of "tax tvfb /dev/rmt0 20". What you see is what you get.

```
rw-r--r--   2/2   10129 Aug  3 14:31 1982 /usr/plx/README
rwxr-xr-x   2/2   18740 Aug  3 14:33 1982 /usr/plx/banner
rwxr-xr-x   2/2   13226 Aug  3 14:34 1982 /usr/plx/copytape
rwxr-xr-x   2/2   46288 Aug  1 10:48 1982 /usr/plx/csh
rwxr-xr-x   2/2     142 Aug  3 14:35 1982 /usr/plx/cshrc
rwxr-xr-x   2/2   14564 Aug  3 14:34 1982 /usr/plx/ctags
rwxr-xr-x   2/2   94062 Aug  3 14:36 1982 /usr/plx/e
rwxr-xr-x   2/2   94062 Aug  3 14:36 1982 /usr/plx/edit linked to /usr/plx/e
rwxr-xr-x   2/2   94062 Aug  3 14:36 1982 /usr/plx/ex linked to /usr/plx/e
rwxr-xr-x   2/2    9262 Aug  3 14:33 1982 /usr/plx/head
rwxr-xr-x   2/2     181 Aug  3 14:35 1982 /usr/plx/login
rwxr-xr-x   2/2   19068 Aug  3 14:32 1982 /usr/plx/ls
rw-rw-r--   2/2    1055 Aug  3 14:37 1982 /usr/plx/man/banner.6
rw-rw-r--   2/2   50116 Aug  3 14:37 1982 /usr/plx/man/csh.u
rw-rw-r--   2/2    2799 Aug  3 14:37 1982 /usr/plx/man/ctags.u
rw-rw-r--   2/2    8596 Aug  3 14:37 1982 /usr/plx/man/edit.u
rw-rw-r--   2/2    7373 Aug  3 14:37 1982 /usr/plx/man/ex.u
rw-rw-r--   2/2     327 Aug  3 14:37 1982 /usr/plx/man/head.u
rw-rw-r--   2/2    5768 Aug  3 14:37 1982 /usr/plx/man/ls.u
rw-rw-r--   2/2    2206 Aug  3 14:37 1982 /usr/plx/man/mkstr.u
rw-rw-r--   2/2    6714 Aug  3 14:37 1982 /usr/plx/man/more.u
rw-rw-r--   2/2     841 Aug  3 14:37 1982 /usr/plx/man/strings.u
rw-rw-r--   2/2   24940 Aug  3 14:37 1982 /usr/plx/man/termcap.5
rw-rw-r--   2/2    3410 Aug  3 14:37 1982 /usr/plx/man/termlib.3
rw-rw-r--   2/2    5192 Aug  3 14:37 1982 /usr/plx/man/tset.u
rw-rw-r--   2/2    1862 Aug  3 14:37 1982 /usr/plx/man/vi.u
rw-rw-r--   2/2    2523 Aug  3 14:37 1982 /usr/plx/man/xstr.u
rw-rw-r--   2/2     434 Aug  3 14:37 1982 /usr/plx/man/printenv.u
rw-rw-r--   2/2    1917 Aug  3 14:37 1982 /usr/plx/man/copytape.lm
rw-rw-r--   2/2     882 Aug  3 14:37 1982 /usr/plx/man/openup.8
rwxr-xr-x   2/2   11486 Aug  3 14:33 1982 /usr/plx/mkstr
rwxr-xr-x   2/2   17774 Aug  3 14:35 1982 /usr/plx/more
rwxr-xr-x   2/2    7762 Aug  3 14:33 1982 /usr/plx/openup
rwxr-xr-x   2/2    7116 Aug  3 14:34 1982 /usr/plx/printenv
rwxr-xr-x   2/2   10664 Aug  3 14:34 1982 /usr/plx/strings
rwxr-xr-x   2/2   15272 Aug  3 14:35 1982 /usr/plx/tset
rwxr-xr-x   2/2     258 Aug  3 14:35 1982 /usr/plx/ttytype
rwxr-xr-x   2/2   94062 Aug  3 14:36 1982 /usr/plx/vi linked to /usr/plx/e
rwxr-xr-x   2/2   94062 Aug  3 14:36 1982 /usr/plx/view linked to /usr/plx/e
rwxr-xr-x   2/2   12434 Aug  3 14:32 1982 /usr/plx/xstr
rw-r--r--   2/2    1102 Aug  3 14:35 1982 /usr/lib/more.help
rwxr-xr-x   2/2   15278 Aug  3 14:36 1982 /usr/lib/ex2.13preserve
rwxr-xr-x   2/2   19248 Aug  3 14:36 1982 /usr/lib/ex2.13recover
rw-rw-r--   2/2    5844 Aug  3 14:36 1982 /usr/lib/ex2.13strings
```

```
rw-r--r--   2/2    96265 Aug   3 14:37 1982 /usr/man/docs/csh/csh
rw-r--r--   2/2       23 Aug   3 14:37 1982 /usr/man/docs/ex/edit.1
rw-r--r--   2/2    52224 Aug   3 14:38 1982 /usr/man/docs/ex/edit.tut
rw-r--r--   2/2     1345 Aug   3 14:38 1982 /usr/man/docs/ex/edit.vindex
rw-r--r--   2/2     3117 Aug   3 14:38 1982 /usr/man/docs/ex/ex.1
rw-r--r--   2/2    57629 Aug   3 14:38 1982 /usr/man/docs/ex/ex.rm
rw-r--r--   2/2    13971 Aug   3 14:38 1982 /usr/man/docs/ex/ex.summary
rw-r--r--   2/2     5697 Aug   3 14:38 1982 /usr/man/docs/ex/ex1.1-2.0
rw-r--r--   2/2    10539 Aug   3 14:38 1982 /usr/man/docs/ex/ex2.0-3.1
rw-r--r--   2/2     7289 Aug   3 14:38 1982 /usr/man/docs/ex/ex3.1-3.5
rw-r--r--   2/2      930 Aug   3 14:38 1982 /usr/man/docs/ex/makefile
rw-r--r--   2/2    24940 Aug   3 14:38 1982 /usr/man/docs/ex/termcap.5
rw-r--r--   2/2     3410 Aug   3 14:38 1982 /usr/man/docs/ex/termlib.3
rw-r--r--   2/2     1792 Aug   3 14:38 1982 /usr/man/docs/ex/vi.1
rw-r--r--   2/2    38894 Aug   3 14:38 1982 /usr/man/docs/ex/vi.apwh.ms
rw-r--r--   2/2    25024 Aug   3 14:38 1982 /usr/man/docs/ex/vi.chars
rw-r--r--   2/2    78384 Aug   3 14:38 1982 /usr/man/docs/ex/vi.in
rw-r--r--   2/2     9772 Aug   3 14:38 1982 /usr/man/docs/ex/vi.summary
rw-rw-r--   2/2      150 Aug   3 14:35 1982 /etc/cshprofile
```